“THE FAR EASTERN REVIEW” – CHINESE RAILWAY CONSTRUCTION

A COMPREHENSIVE STUDY OF HISTORICAL REFERENCES WITHIN THE LIFE OF THIS JOURNAL OF THE DEVELOPMENT & CONSTRUCTION OF CHINA’S EARLY RAILWAYS, INCLUDING EXTRACTS OF RELEVANT PAGES (**SECTION 7 of 14**)

BY PETER A. CRUSH

For Introduction please see preface to Volumes I - V

(Note : to view the relative pages of the magazine, scroll down to end of these notes for each volume, respectively)

Volume XIX

Note: In this volume and subsequent volumes G.B. Rea continues with a journal heavy on political commentary and with fewer articles about engineering projects. The useful “Engineering Notes” at the rear of each monthly number are either absent or reduced in quantity and quality. Rea appears to “have lost the plot” and engages in long personal rants criticising just about everybody except Japanese officials and politicians. .

January 1923

Tzuchuan Coal Advertisement for the Tzuchuan (淄川 *Zichuan*) colliery which was a subsidiary of the Shantung Railway Company.

The Tangshan Works An illustrated description of the Tangshan Locomotive Works by H Stringer . 1 sketch plan of the works and several photographs. (For better resolution images see the Album P27 in this collection).

The Chinese Eastern Railway A summary of the latest annual report. 15 small photos.

February 1923

The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.

Another Railway Loan A short report alleging that an unauthorized loan had been obtained from a Belgian syndicate for completion a section of the Lunghai railway.

Construction of a 305-ft Span Railway Bridge An engineering paper by E T. Forestier about the building of a bridge for the Shanghai-Hangchow-Ningpo Railway. Several sketch plans & 2 small photos.

Baldwin Switcher Locomotive Advertisement by Baldwin Locomotive Works illustrating 0-6-0 locomotive built for the Liu Chang Coal Mines.

March 1923

Main Line Electric Locomotives Advertisement for electric locomotives by the English General Electric Company.

Hongkong and Canton A report about British objections to a spur line being built from the Canton-Kowloon Railway to a proposed new large port opposite Whampoa. The British feared it would diminish Hong Kong's importance as south China's premier port.

Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders. 1 photo of a Kitson engine built for the KCR.

April 1923

The Drewry Car Company Small advertisement for Drewry rail cars.

Harriman's Far Eastern Plans A long extract from a book about the late American railway financier's plan to take control of the Chinese Eastern Railway.

36-Ton Breakdown Crane for the S.N.R. Photo and description of a new large crane built in Britain for the S.N.R.

Tientsin-Pukow Trains Deluxe Description of newly acquired U.S.-made passenger rolling stock. Numerous photos and sketches.

May 1923

The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.

June 1923

Anshan Iron Mines Extract from article about the mines. 6 photos showing railway loading points.

Japanese Locomotives Built for a Chinese Railway Large photo of one of four 'Consolidation' type engines built in Japan for the Shantung Railway.

Baldwin Six-Wheeled Switchers Advertisement for Baldwin engines. Includes small photo of locomotive built for the Liuchang Coal Mine.

July 1923

Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders. Includes 1 photo of saddle tank built for the S.N.R. Most likely an engine built by Bagnall in 1905.

August 1923

The Racial Issue Nothing to do with railways but an example of how the Publisher/Editor Rea, was progressively becoming anti-Chinese, complaining about illegal Chinese immigration into the USA (this was at a time when USA was welcoming almost unlimited numbers from Europe). In later issues Rea argues that the Japanese should be allowed in but not Chinese (who were denied immigration under the Chinese Exclusion Act).

The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.

Fairbanks, Morse & Co. Small advertisement for "Sheffield 32" brand rail cars & rail track inspection trollies.

Foreign Supervision Over China's Railways An editorial suggesting that China's railways were being "looted" when under Chinese management but

not when under good “foreign” management like the Japanese SMR. A long list of comparative earnings of China’s railways.
Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders.

October 1923
Hasler Telegraph Works Advertisement for Locomotive Speed Indicators & Recorders.

November 1923
Pooley Railway Weighbridges Advertisement by Henry Pooley & Son of UK, manufacturer of weighbridges for railways.
The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.
Elesco Superheaters Small advertisement for locomotive superheaters, made in USA.
New Locomotive for the Shantung Railway Short description of a 4-6-2 locomotive made by the Kisha Seizo of Osaka.1 photo.
Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders. Includes 1 photo of a 2-4-2 locomotive (No 216) built for the PMR by Hawthorne Leslie.

December 1923
Dorman, Long & Co. Advertisement by British steel companies for the production of rolled steel rails and other steel products.
Indo-China Railways 1 The first of a two-part history of the construction of railways in French Indo-China. This includes the Yunnan Railway in China.

ALPHABETICAL LIST OF ADVERTISERS

Admiral Line, The 41
Allen & Co., Ltd., Edgar 14
American Locomotive Sales Corp..... 25
American Tool Works Co. 1
Andersen, Meyer & Co., Ltd. 28
Asbestos Shingle, Slate & Sheathing Co. 17
Ashton Frost & Co., Ltd..... 19
Atlantic, Gulf & Pacific Co of Manila 36
Attwater & Sons 48
Avery, Ltd., W. & T..... 15

Babcock & Wilcox, Ltd. 31
Baldwin Locomotive Works..... 67
Bank of Chosen 54
Bank of Communications..... 59
Banque de l'Indo-Chine 56
Bank of Taiwan, Ltd. 57
Bliss Co., E. W. 27
Brill Co., J. G..... 39
British-American Tobacco Company (China), Ltd. 52
Browning Co., The 65
Brunswick Kroeschell & Co..... 49
Bucyrus Company 9
Butterfield & Swire 44

Canada Carbide Co. 15
Chartered Bank of India, Australia & China 48
Chicago, Milwaukee & St. Paul Railway 39
Clough, S. W. 4
Craig & Donald, Ltd. 31

Dai-Ichi Ginko 62
Dai Nippon Brewery Co. 74
Diamond Power Specialty Corporation 42
Dixon Crucible Co., Joseph 76
Dorman Long & Co., Ltd. 3

Drewry Car Co., Ltd. 19
Drysdale & Co., Ltd..... 73

Electricity Department, S. M. C. 4
English Electric Co., Ltd. 13
Evans & Sons (Wolverhampton), Ltd., Joseph 2

First National Bank of Boston..... 57
Fuji Gassed Spinning Co. 10

Gleniffer Motors, Ltd. 15
Goodell-Pratt Co. 65
Green Island Cement Co., Ltd., The.. 20
Greenfield Tap & Die Corp..... 19
Greening & Sons, Ltd., N. 4

Heap & Co., Ltd., Joshua 53
Hongkong Rope Manufacturing Co. . 20
Hongkong & Shanghai Banking Corporation..... 63
Hongkong & Whampoa Dock Co., Ld. 30
Hotel Statler Co. 51
Humber, Ltd..... 11

Imperial Japanese Government Railways 68, 69
Industrial Bank of Japan 58
International Banking Corporation.. 55
International General Electric Co., Inc..... 74

Japan Sugar Mfg. Co. 6
Jardine, Matheson & Co., Ltd. 12
Jones & Lamson Machine Co..... 53
Jugo Ginko 56

Kanegafuchi Spinning Co., Ltd. 10
Kawasaki Dockyard Co., Ltd..... 35

Kellogg Switchboard & Supply Co... 64
Kelvin, Bottomley & Baird, Ltd..... 8
Kokusai Kisen Kaisha 45

London Directory Co., Ltd..... 74
Low & Sons, Ltd., Archibald..... 42

Manning, Maxwell & Moore, Inc..... 76
Mather and Platt, Ltd..... 7
Matthews & Yates, Ltd. 42
Metropolitan Vickers Electrical Co., Ltd. 64
McClintic-Marshall Products Co. 27
McConway and Torley Co. 21
Mitsubishi Bank 61
Mitsubishi Iron & Steel Co., Ltd.... 38
Mitsubishi Marine & Fire Ins. Co., Ld. 38
Mitsubishi Shoji Kaisha 18
Mitsubishi Warehouse Co. 38
Mitsubishi Zosen Kaisha, Ltd..... 26
Mitsui Bank 61
Mitsui Mining Co..... 18
Mitsui Bussan Kaisha 26
Morse & Son, Inc., A. J. 74
Motor Rail & Tram Car Co..... 41
Mustard & Co..... 4

New Engineering & Shipbuilding Works..... 34
Nippon Menkwa Kabushiki Kaisha.. 50
Nippon Yusen Kaisha 46, 47
Nobel Industries, Ltd. 22

Okura & Co. (Trading), Ltd..... 24
One Hundredth Bank, Ltd., The 62
Oster Manufacturing Co. 63

Pittsburgh Steel Co. 73
Pooley & Son, Ltd., Henry 2

Republic Truck Sales Corp. 11
Royal Bank of Canada 57
Ruston & Hornsby, Ltd..... 21
Ryerson & Son, Joseph T. 5

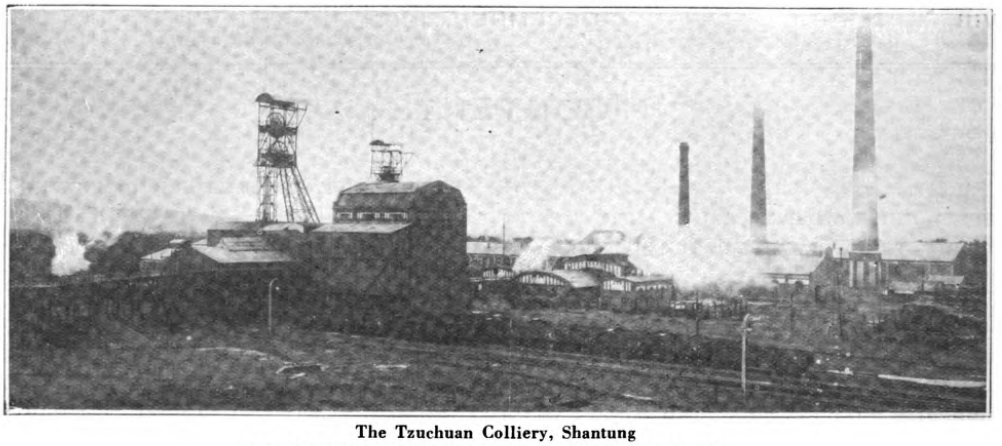
Sale & Frazar, Ltd. 16
Scottish Tube Co., Ltd..... 8
Selson Engineering Co., Ltd..... 43
Shanghai Dock & Eng. Co., Ltd..... 32
Shanghai Municipal Council 4
Shantung Railways 72
Simons & Co., Ltd., Wm. 14
Smith, Major & Stevens, Ltd. 33
South Manchuria Railway Co. 66, 70, 71
Standard Oil Co. of N. Y. 29
Sulzer Bros. 39
Sumitomo..... 60
Sumitomo Bank, Ltd. 60
Superheater Co., The 73

Thornycroft & Co., John I..... 1
Toshin Soko 40
Toyo Kisen Kaisha 43
Trimont Manufacturing Co. 9

United Cigarette & Machine Co. 41
United States Steel Products Company..... ... 23, 37, Back Cover

Walworth International Co. .....Cover
Wharton Jr. & Co. Inc., Wm. 21
Whittall & Co., Ltd., J. 6
Wild & Co., M. B. 9
Williams & Co., J. H. 7

Yarrow & Co., Ltd.....Cover
Yokohama Dock Co. Ltd. 33
Yokohama Specie Bank, Ltd.....Cover



The Tzuchuan Colliery, Shantung

TZUCHUAN COAL

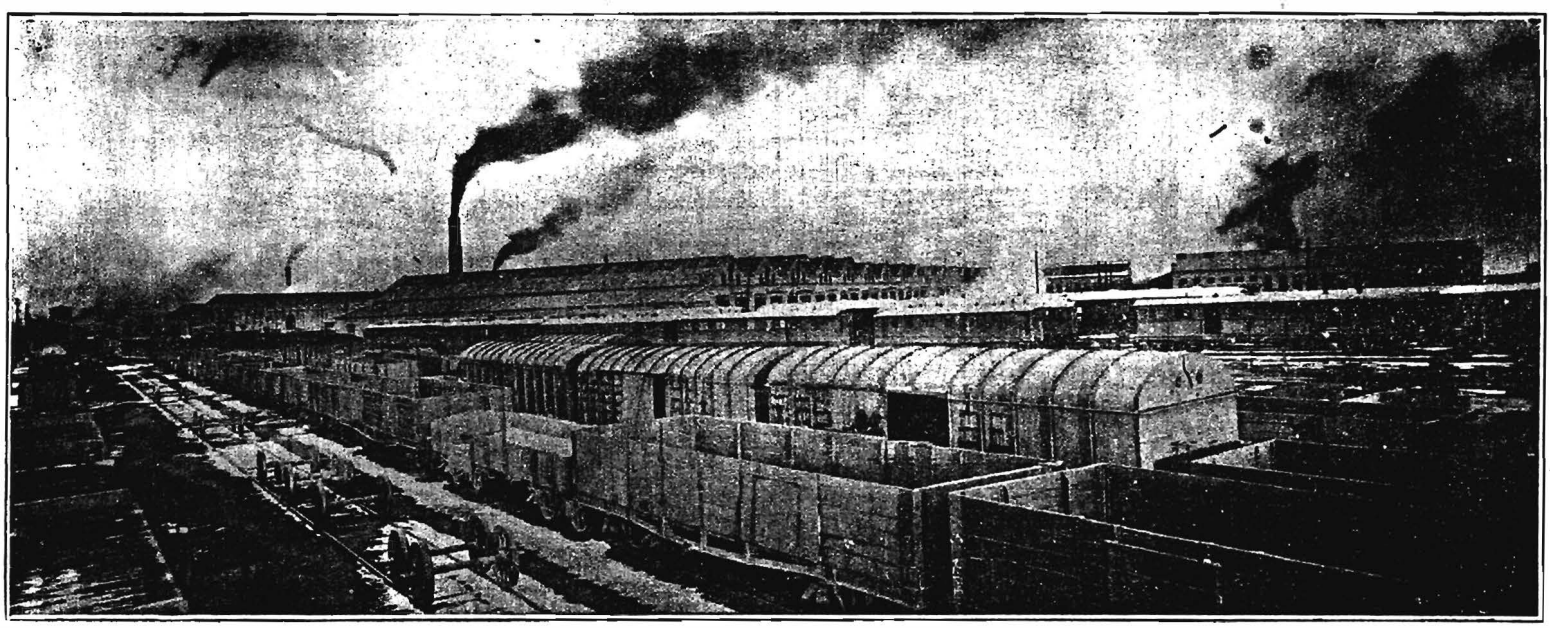
The Cheapest and Best Coal Mined in the Far East

Annual Output: 600,000 tons.
The Coal is washed, screened, and classified for the market into five grades, viz., Lump, Slack, and Washed Coal Nos. 1, 2 and 3.
Tzuchuan Coal contains a large amount of coke, with only a small amount of ash, and has a heating capacity of 7,500 calories.
Tzuchuan Coal, which rivals the best Cardiff Coal, is highly recommended for Coke and Briquette manufacture, for Boiler and Marine use and for General Domestic use
Tokuyama Briquette Factory, Yawata Iron and Steel Works, and many other important works in Japan and China are constant purchasers.
The Wharves at Tsingtao are well accommodated as Coaling Stations for Coast and Ocean liners.

For further information please apply to the

SHANTUNG RAILWAY ADMINISTRATION

Cable Address: "SANTETSU" TSINGTAO, CHINA Codes: A.B.C. 5th Ed. & A.1.



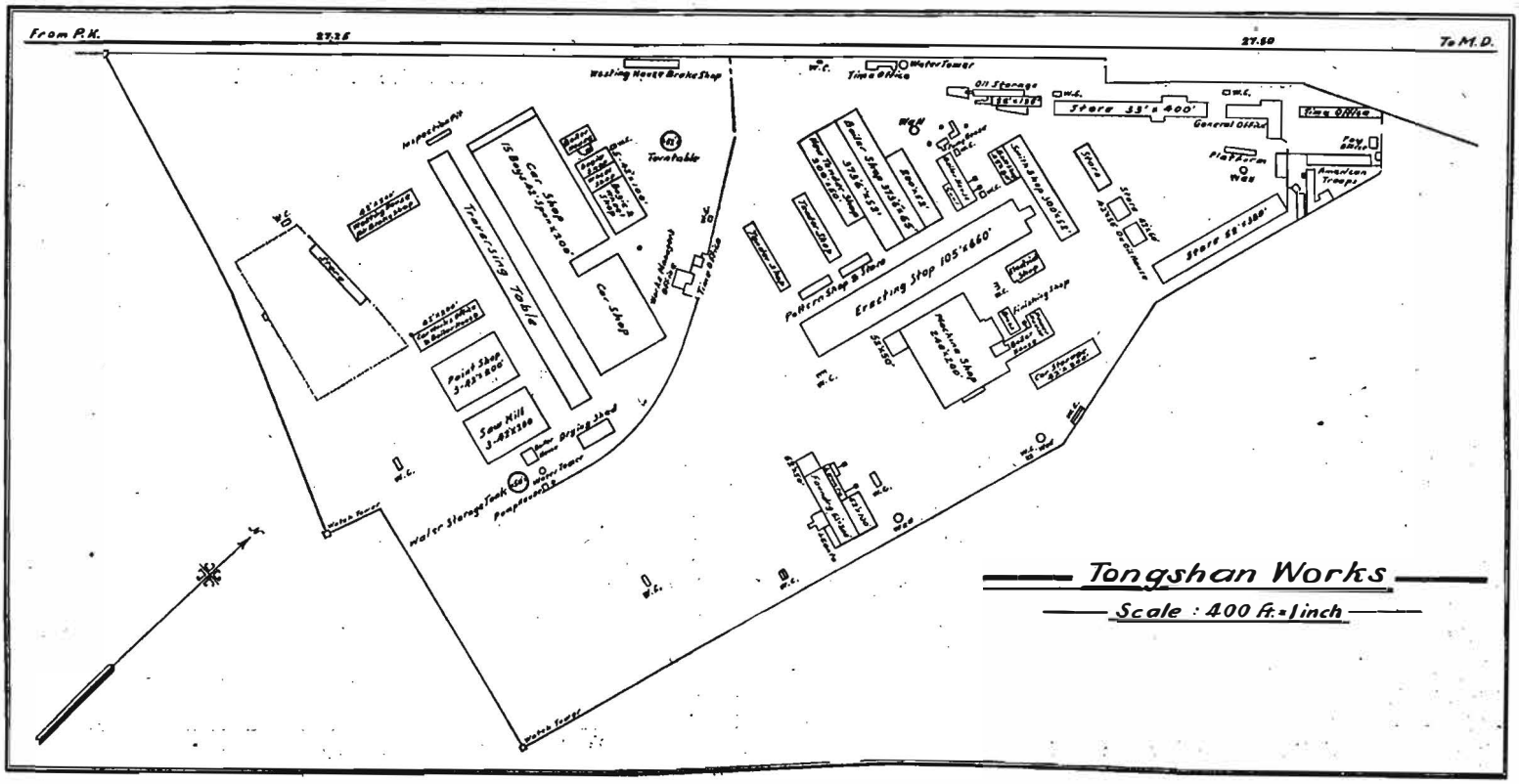
View of Tangshan Works

THE TANGSHAN WORKS

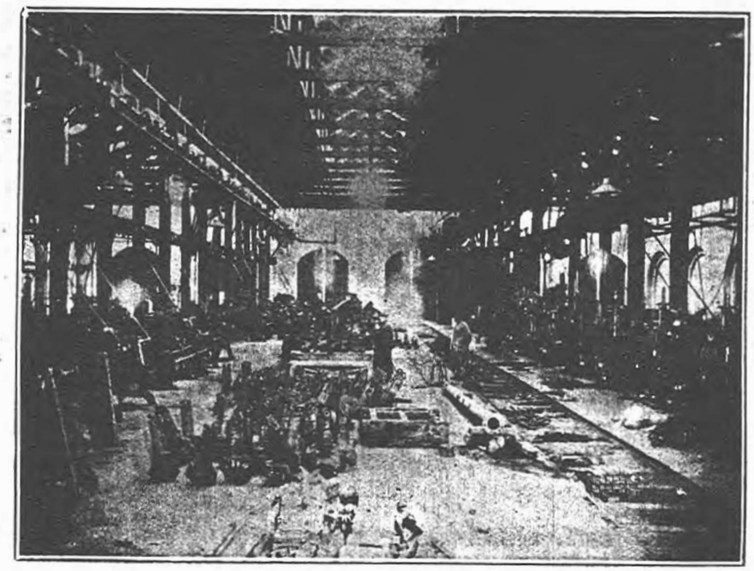
H. STRINGER, B.A., A.M.I.C.E.

THIS is the locomotive carriage and wagon works of the Peking-Mukden Railway. The present works replaced one on a much smaller scale now utilized as repair shops by the Kailan Mining Administration. Building on the present site began in 1899 the first structures to be put in hand being the erecting, boiler and machine shops, smith's shop, stores and time office. These were completed in 1900 and by 1903 the whole works had been removed. Considerable extensions were made in 1907 more particularly to the car works and since 1915 there has been considerable building activity in all departments.

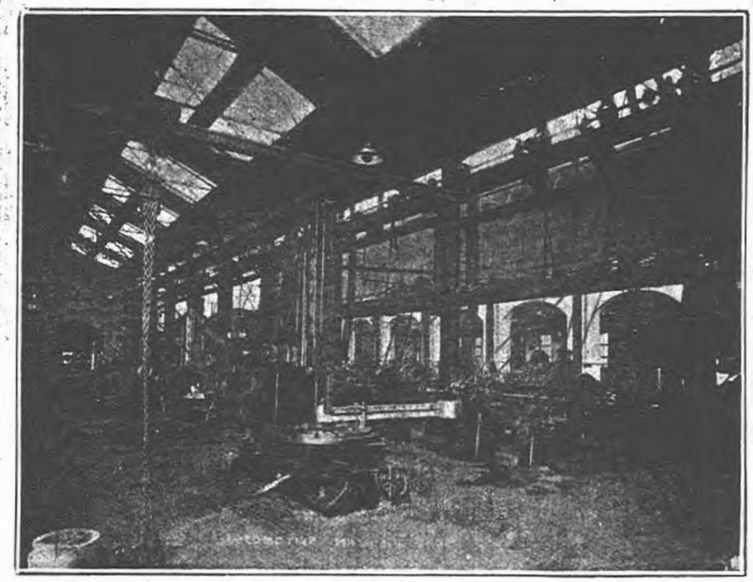
Power is derived from three main boiler houses for the locomotive and car works, and the electric power-house. The first boiler house is equipped with two Babcock and Wilcox, five Cornish and two Lancashire boilers, the second with four Babcock boilers and the last, with eight Babcock boilers. There is also an auxiliary boiler house equipped with three Cornish boilers which supplies power to the log frame, steam-driven saw, in the saw mill, and heating to the paint shop and car works offices. The Westinghouse air-brake shop also has its own boiler power supplied from one loco. boiler at 180-lbs. per sq. inch. Steam pressures are 160-lbs. per sq. inch in the electric power-house and 100-lbs. elsewhere; all boilers are hand fired. The annual coal consumption is some 14,800 tons about 55 per cent. of which is consumed in the five winter months from November to March when the demands for heating are heaviest. The prices paid for coal are $3.50 for lump and $2.50 for slack.



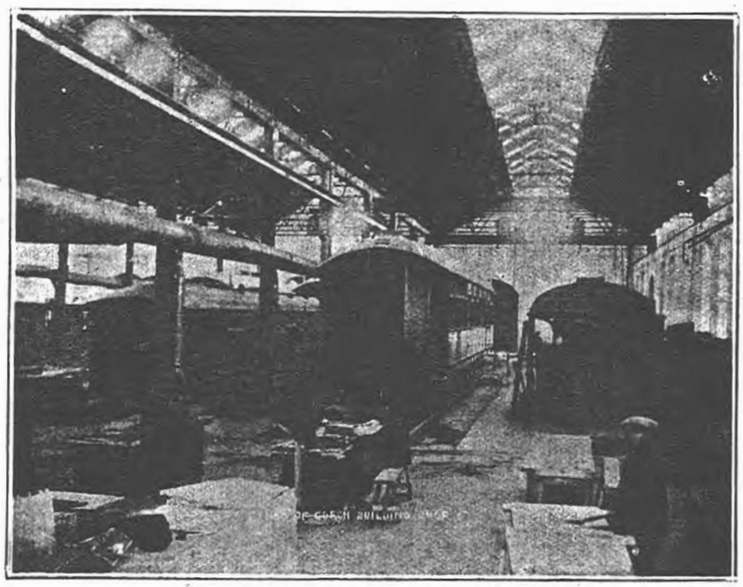
THE TANGSHAN WORKS



Machine Shop—Car Works

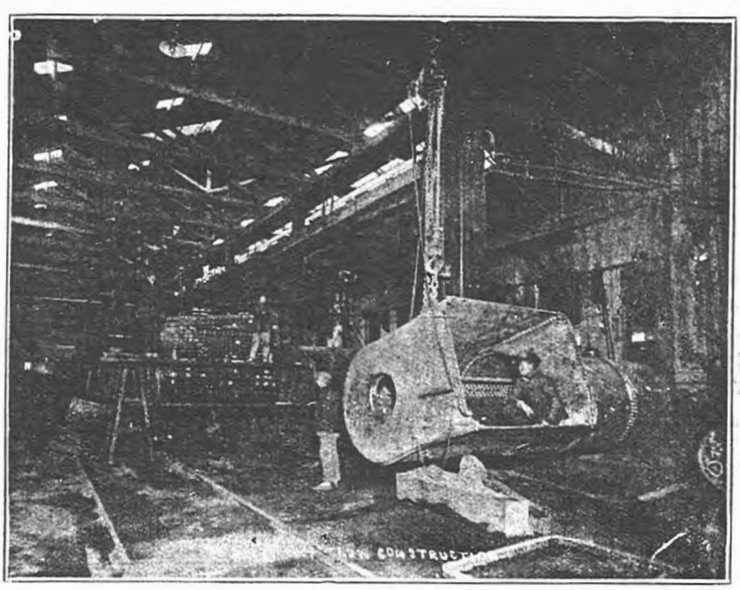


Locomotive Machine Shop



Corner of Coach Building Shop

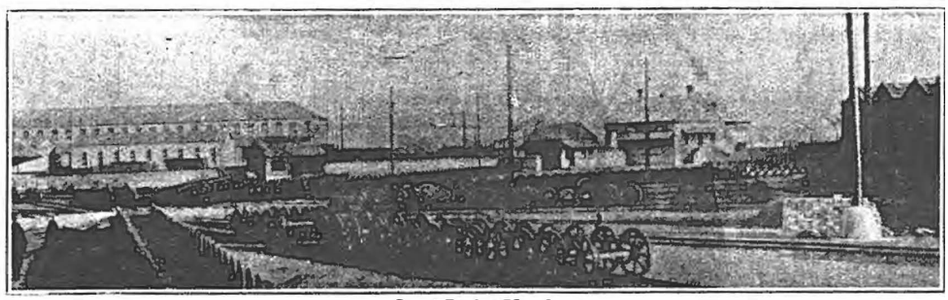
Locomotive Erecting Shed



Boiler Shop—New Contruction

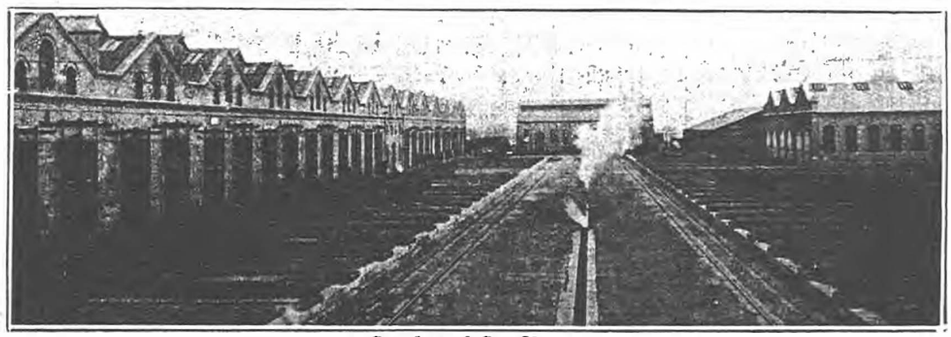
Car Shop

As everywhere electricity is largely replacing steam for motive purposes. Power is supplied at present from two 110 kilowatt direct current Crompton generators, and one of 225 kilowatts of the same make, all driven by Belliss & Morcom compound high-speed vertical engines. The pressure is 220 volts.. Motors are now installed with a nominal total capacity of 1,000 B.H.P. rated continuously, and the average daily power-house output is 3,000 kilowatt hours. Power is distributed from a 22 panel switchboard also by Cromptons. To cope with recent developments a new 500 kilowatt generator of the same make is now being installed which will give a total brake horse-power capacity in the power-house of 1,455 or 949 kilowatts. In connection with the power-house there is also a battery 118 cells with a capacity of 420 ampere-hours.



Car Works Yard

Hydraulic power at a pressure of 1,500 pounds is supplied to hydraulic rivetters and presses from an accumulator worked by three pumps. Air pressure is in universal use all over the works for drills and hammers, air at 100 pounds per sq. inch being supplied from three compressors in the car works and four in the locomotive works. Generally speaking all the heavier machines have their own electric drive, and shafting is electrically driven in all machine shops and the saw mill. Steam is confined to the smith's shops for steam hammers, and for heating. The shop cranes of heavier capacity are all electric driven.



Coach and Car Shops

The water supply of the works is obtained chiefly from one 8-in. borehole of a depth of 90-ft. approximately. There are also seven surface wells from which water is pumped by steam or electrically and by compressed air wherever depth permits. The bore hole output of 8,000 gallons an hour together with that of two surface wells (operated by compressed air and giving 4,000 gallons an hour) gravitates to a reinforced concrete reservoir of 250,000 gallons capacity, whence it is electrically pumped in to a water tower of 35,000 gallons which is connected with a second tower of 35,000 gallons capacity (the water being under a mean head of 40-ft.). The average daily consumption is 160,000 gallons (winter months 200,000 gallons) of which the works itself consumes an average of 80,000 gallons the balance being used for locomotive supply, the shed tank in the station drawing from the same source.

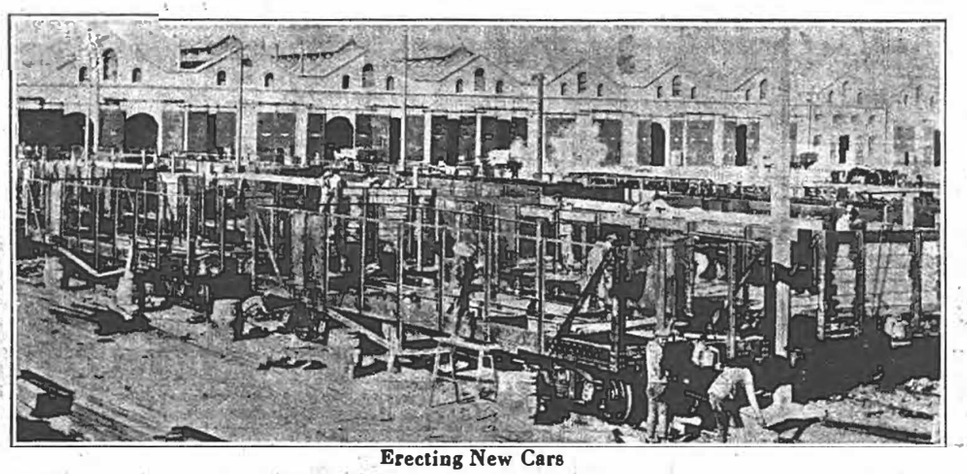
With regard to the shops in detail, the boiler shops are in process of re-organization. Very shortly they will be capable of dealing with 28 boilers under repair, eight boilers under construction and twelve under test and mounting. These shops are served by one 30-ton electric crane, one 15-ton electric crane and another 30-ton electric crane is to be shortly installed. The equipment is remarkable for an Armstrong Whitworth boiler shell boring machine which will drill a fire box—900 holes in one working day against eight days required by older methods. There is also a rotary splitting shears by Ryersons of Chicago which will shear plate up to 1¼-in. thick on a 10-ft. gap. There is also a large vertical gap hydraulic rivetter for boiler rivetting fixed in a pit and served by a 20-ton crane (hand) which is also utilized for the shell boring machine previously mentioned. A hot flanging press (Twedell system) capable of flanging plate up to ¾-in. is in use for boiler shops and car requirements.

Boiler plates are shaped by a Smith vertical plate bending rolls capable of taking inch plate 12 feet long, while there is also a large Bennie plate punching machine with a capacity for 1¼-in. holes in 1¼-in. plate. There are two Alfred Herbert automatic stay-making machines. Boiler tubes are scaled on withdrawal by a machine on the friction roller principle designed in the works. Ends are also cropped and safe ended by machine; and afterwards tested hydraulically up to 250-lbs. per sq. inch. A scaling machine which scales tubes by stretching by hydraulic power is also giving good results. At present 30 new boilers are under construction.

The tender shop which adjoins these buildings is provided with eleven pits each of which will accommodate two tenders. It is served by a 30-ton electric crane and the building is of sufficient height to admit of tenders being lifted over each other to the two tracks which serve the shop.

The erecting shop is furnished with longitudinal pits and is equipped with two 45-ton electric cranes together capable of handling the heaviest engine now in use.

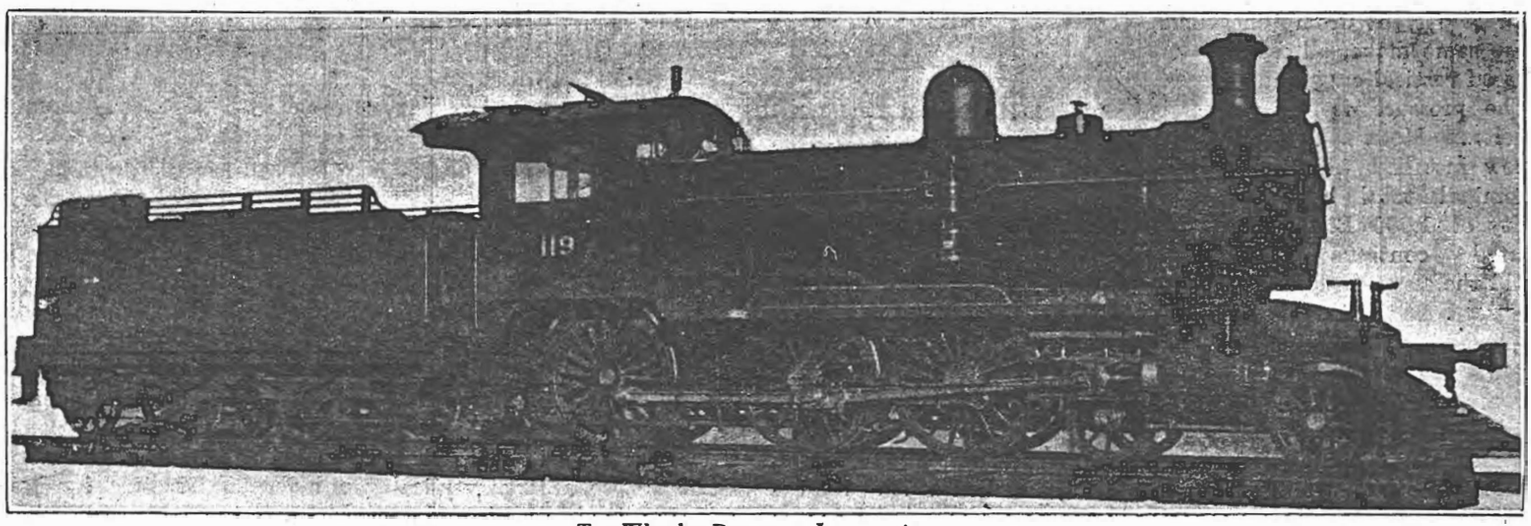
The shop has portable self-driven machines for machining horn blocks and for reboring cylinder barrels in position. About fifteen locomotives pass through the shop each month of which five are general overhauls.



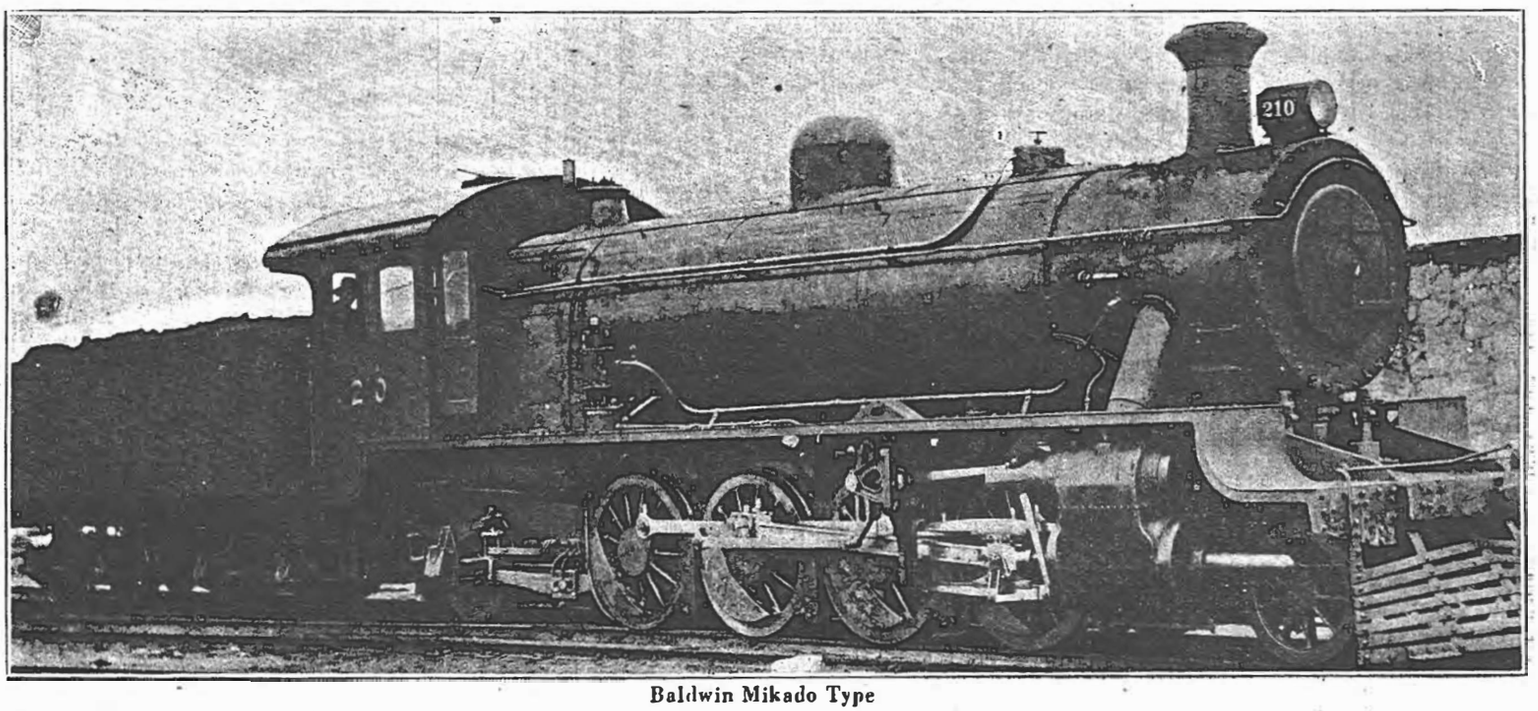
Erecting New Cars

In a lean-to to this shop is the engine painting department shortly to be moved to the main paint shop the traverser for which having been recently converted to electric drive and strengthened for loads of 80 tons.

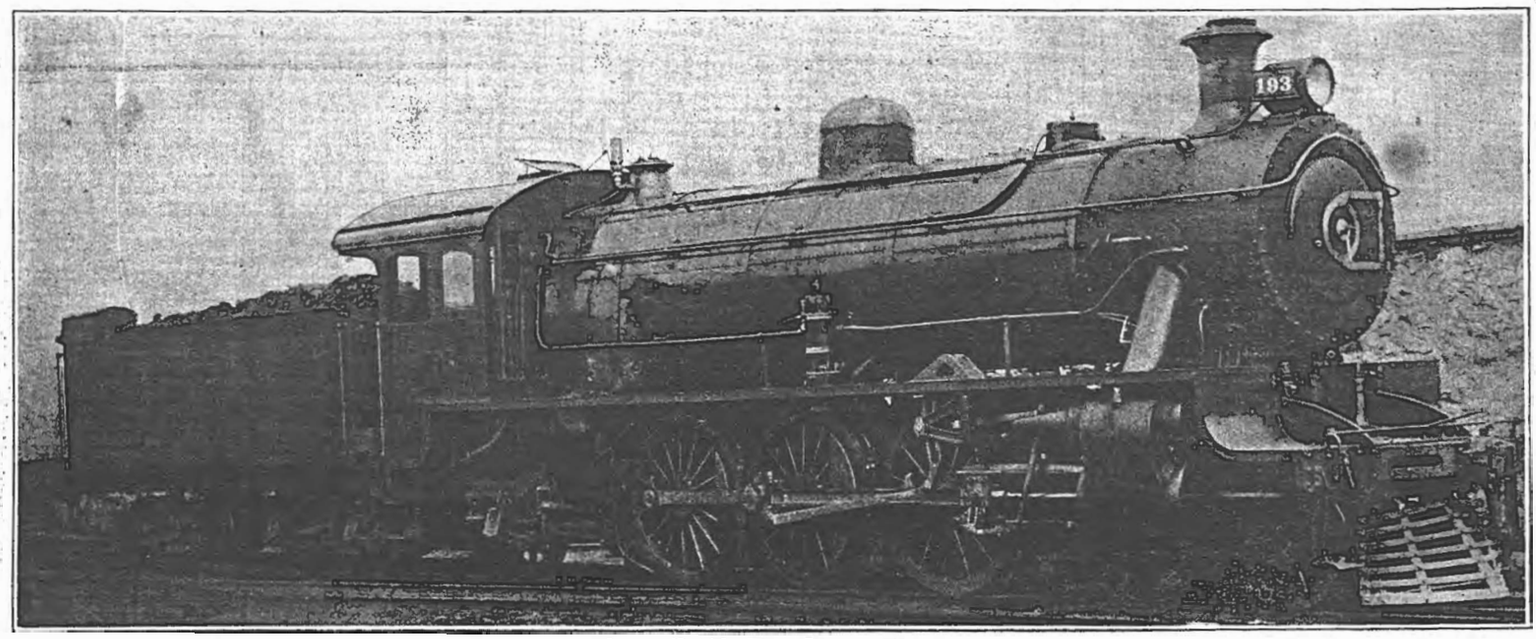
TYPES OF LOCOMOTIVES BUILT AT THE TANGSHAN SHOPS



Ten Wheeler Passenger Locomotive

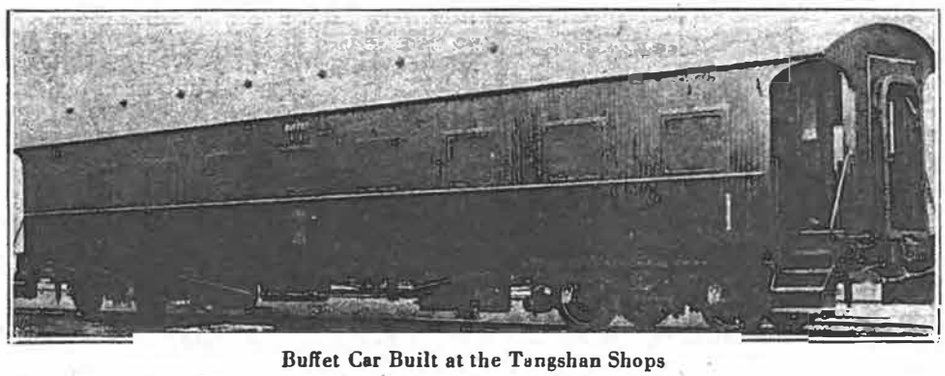


Baldwin Mikado Type



Latest Pacific Type Locomotive

The machine shop equipment is mainly remarkable for a 7-foot boring mill by Cravens, a 42 inch duplex boring mill by Webster and Bennett and a London wheel lathe which will deal with 5-ft. 6-in. diameter wheels. It has the latest hydraulic equipment for removing and fixing wheels and axles, is furnished with a case hardening plant, and has oxy-acetylene and electric welding plants sufficiently portable to work in other shops if needed. The bay dealing with wheels and axles is served by a 10-ton electric crane.



Buffet Car Built at the Tangshan Shops

Eight new locomotives are under construction the only finished material imported being wheels and axles, springs and brake equipment.

The foundry is served by a 10-ton electric crane. It is equipped with pneumatic moulding machines for repetition work and has two Morgan tilting crucibles in the brass foundry. The output is about 90 tons of iron and 16 tons of brass castings per month. This cannot keep pace with growing requirements and the foundry is in process of enlargement.

The car works has its own smithy, frame, and machine shops. and a separate department for dealing with wagon wheels and axles. The smithy, which has 92 fires, five steam hammers and two hot saws, is mainly remarkable for a Brett three stage drop hammer battery for stampings and general smith work. The machine shop has the usual equipment including a Putnam wheel lathe which turns down seven pairs of car wheels per day at a cost of 36 cents each. The saw mill serving these shops is the most recent addition to the works. With the exception of a 60 h.p. vertical steam log saw the motive power is electric to the extent of 130 h.p. The shafting with the exception of saw sharpening tools is in pits. The machines are all of English manufacture. Timber is mainly imported in log, but two inch planks for car bottoms are also stocked. With this exception the saw mill meets all requirements as regards scantlings, mouldings, flooring, also mortising and planing, for carriage and wagon work. A drying shed with steam-drying chamber is provided for seasoning timber.

Standard Passenger Car Truck

The paint shop which is steam heated and has six pits is of sufficient size to accommodate sixteen passenger cars. Repairs and painting of wagon stock are at present carried out in the open. Bogies and underframes are painted with a tar paint neutralised with cement.

The Westinghouse air-brake shop is used for the repair and testing of this brake which is standard on the railway. In the same building is housed the electrical department which in addition to maintaining the electrical equipment of the works is responsible for the lighting of eight stations, the maintenance of train lighting sets of which there are 141 on the Stone system, and the care of fan equipment, and of those staff quarters electrically lit.

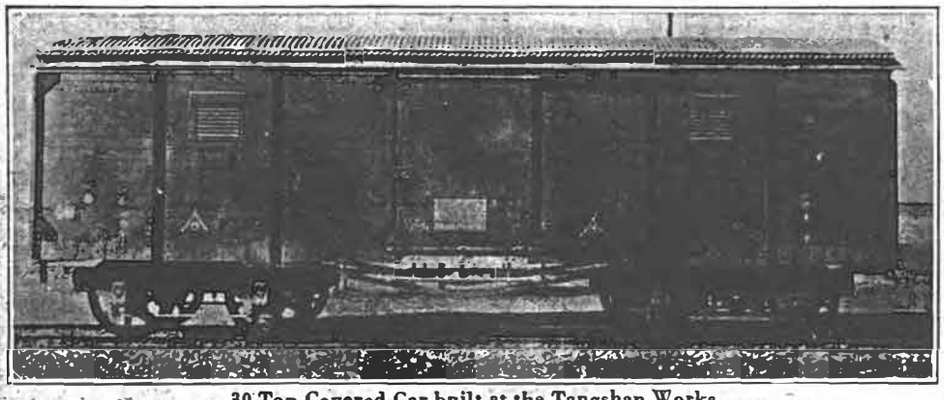
The car works is served by an electrically driven traverser taking loads up to 80 tons.

Wagon stock repairs are carried out entirely in the open, the sidings being able to deal with 300 cars per month. Sixteen passenger cars and sixteen brake vans are at present under construction. As regards passenger car construction the only finished materials imported are springs, wheels and axles, brake and electrical gear. Everything else even to nickel plating tailoring and upholstering is carried out locally. Recent additions to wagon stock include 300, 40-ton all steel coal cars and 200, 30-ton covered cars by the Metropolitan Carriage and Wagon Co. The cars are sent out knocked down and are rivetted up at the rate of sixteen a week. The works is equipped with an up-to-date tailor's shop, has three bolt and rivet making machines with a capacity of 60,000 per month, and all cotton waste from shops and car axle boxes is passed through a Tern De-Oiling plant which extracts and purifies the oil, and renders the waste fit again for shop and locomotive shed use.

This completes very summarily the detail notes of the various shops. To again generalise, the heating of the shops is either hot air on the Sturtevant principle or steam through radiators manufactured from old boiler tube.

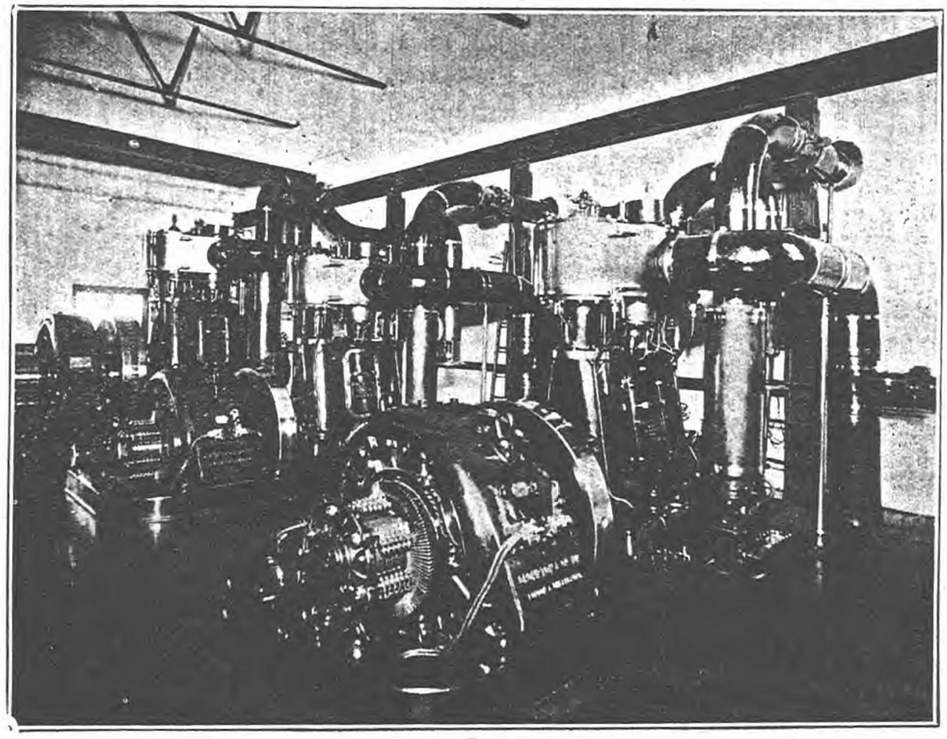
Until within a year ago the pail system was in use for dealing with sanitation, but incinerators after a design used hy the British armies in France have recently been installed for dealing with solids. These have so far worked very successfuly but of course the system earns no revenue as the old one did.

Structurally great attention has been paid of late years to the elimination of fire risk. On this account second floors where provided are in re-inforced concrete, windows are in cast iron or of angle iron construction, doors of steel and lintels for the same also of concrete. Buildings are carried out in the native blue brick on a rubble base wherever circumstance admit, but where work of any strength is required a hand-made fire-clay brick is used which



30-Ton Covered Car built at the Tangshan Works

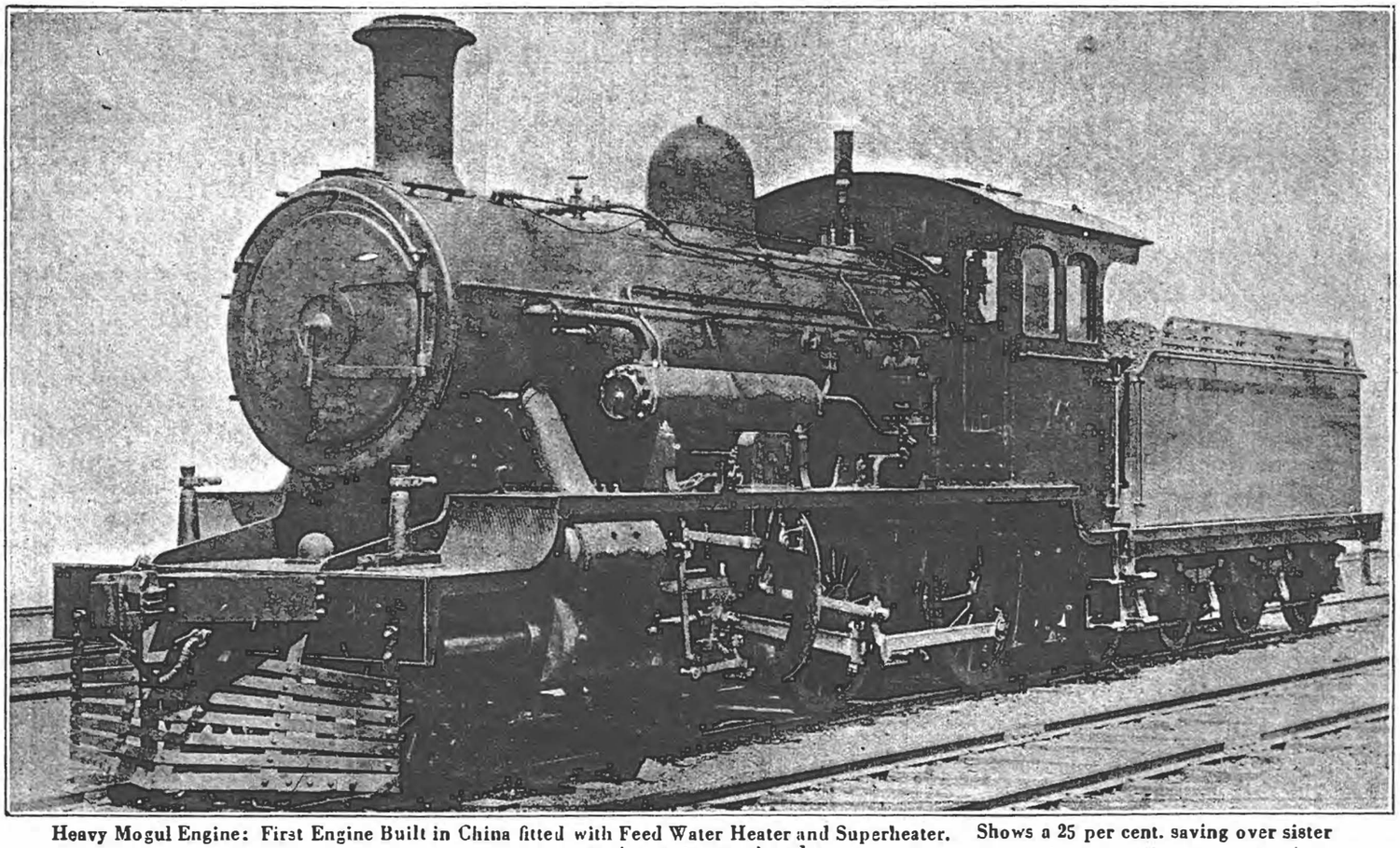
crushes at about 1,200-lbs. per sq. inch. Floors are in concrete; wood blocks cut from old sleepers and soaked in tar have been tried for this purpose, but they are not an unqualified success being far too sensitive initially to temperature change. Roofing during the war was carried out in waterproofed felt laid in pitch on boards, and this policy may be continued in Smithies and engine sheds but even in such unsuitable localities galvanized iron has recently been removed after being in service 17 years. There is thus little question that this material will again come into favor for general roofing purposes in a climate with the extremes of North China. Roofs are all of the ordinary ridge type with about a quarter rise. Skylights on all new work are in wired glass and roof lighting is proportioned at the rate of 25 per cent. of roof area. Store racks are either in steel or in reinforced concrete on fire-brick pillars in the case of new work. Craneways are carried on arches wherever height permits.



Power Plant—Tangshan Shops

The works has a 12-foot macadamised road running through it and the various shops are served by 13.5 miles of sidings. Main roads are all under a 60-pound rail, car repair and shop sidings have either a 45 or 50-pound rail. Where loads are light and in sidings under cover a re-inforced concrete sleeper, re-inforced with old boiler tube, is in use.

As regars labor, at the present time some 3,000 men are employed. These men wherever feasible work under the Halsey bonus system based on estimates, as introduced in the Sakako Works of the South Manchuria Railway. Piece work is not usual except in cases of special urgency, the bonus system giving very satisfactory results (the average bonus earned being about 30 per cent.) The wages paid are as follows: Fitter 1.96 maximum; smith 1.86 maximum; carpenter 1.30 maximum; 0.36 to 0.48 coolie. Up to date there have been no labor troubles worthy of mention, but the politically actuated agitator has recently appeared promising Utopias and framing exorbitant demands. They who listen and throw up their hats are at present a small minority but labor has always been ruled by articulate and noisy remnants so that the future is somewhat



Heavy Mogul Engine: First Engine Built in China fitted with Feed Water Heater and Superheater. Shows a 25 per cent. saving over sister engines not so equipped

hazy in this respect, though it is to be hoped that the innate conservatism of the Chinese may counteract this disturbing factor. Supervision of the shops is in the hands of seven British foremen.

The drawing office is divided into two departments—locomotive and tools, and cars and is in charge of a European chief draughtsman who controls 30 Chinese draughtsmen. It is equipped with the necessary valve gear and other models, and has a Photostat apparatus for rapid printing and plain reduction. Any tests carried out are supervised by this department, there being a 30-ton Buckton testing machine for tensile and bending tests, and a drop testing machine for axles with a 1-ton tup, and a maximum fall of 40 feet.

I am greatly indebted to Mr. F. A. Jamieson, locomotive and works superintendent, and Mr. F. Sugden, works manager, for much information which is embodied in this article, and I have also to thank Mr. L. J. Newmarch, the engineer-in-chief and general manager, of the Peking-Mukden Railway, for permission to make use of this information.

New Tendency in Japan's Silk Spinning Industry

AT the time of the panic in 1920, the silk spinning industry was the hardest hit of all Japanese industries. Not only newly established companies were ruined but such old concerns as the Fuji Gas Spinning Co., Ltd., and the Kanegafuchi Cotton Spinning Co., Ltd., incurred great losses on their silk business, at the same time their cotton spinning business was going from bad to worse.

Towards the end of 1921, the industry took a favorable turn, and the end of the year was prosperous. Prices rose abruptly, and many of the new companies such as the Japan Silk and Wool Spinning Co., Ltd., were able to clear losses and this company was even able to pay a ten per cent. dividend for the term. With the new concerns making such profits, it is natural that the old companies with excellent equipment, and comparatively low fixed capital should have made greater profits. Kanegafuchi Spinning is said to have made a net profit of Y.3,600,000 on its silk spinning alone during the latter half of 1921. This is the company which pays 70 per cent. dividends on its paid-up capital, and whose shares are quoted at six to seven times their par value. One-fourth of the investment of the Fuji Gas Spinning is in silk spinning, so it can readily be seen that its business results the second half of 1921 must have shown a decided improvement over the other terms passed since the panic.

Improvement during the second half of 1921 has not held into 1922. Market quotations steadily declined, and raw materials have been ruling at comparatively high prices. Profit this year have varied from Y.39 to Y.52 per 10 *kwan* (82.8-lbs.), and compared to other lines of industry the silk spinning industry is in a very advantageous position.

The latest tendency in the industry is one of mueh interest. Spun silk yarn which used to be exported is now woven before it is sent abroad. This tendency is growing more and more marked. The cloth woven from spun silk yarn is called "Fuji Ginu"—"Fuji Silk," not after the mountain of that name, but after the Fuji Gas Spinning Co., which was the first weaver of this kind of silk material:—

The following table compares exports of spun silk, waste silk thread, and Fuji Ginu (Fuji Silk) during the first seven months of the past three years:—

(000 omitted)

Kind	1920	1921	1922
Waste Silk Yarn:			
Quantity	38,155 pieces	21,621	39,353
Value	Y.15,061	Y. 3,386	Y. 6,232
Spunk Silk:			
Quantity	2,952 pieces	1,576	1,396
Value	Y. 2,371	Y. 1,785	Y. 700
Fuji Silk:			
Quantity	—	15,498 yards	16,055
Value	—	Y.12,854	Y.17,088
Floss Silk, Mawata:			
Quantity	6,987 pieces	587	1,217
Value	Y. 6,638	Y. 327	Y. 557

Exports of spun silk have greatly decreased. Exports of Fuji silk, which were not itemized in the monthly report of the Customs bureau until 1921, have increased both in quantity and value. This is a sufficient sign that Japanese export trade is showing a change from the report of raw silk to that of silk textiles.

Fuji silk is manufactured to-day not only by the Fuji Gas Spinning Co., Ltd., but by the Japan Silk Textile Co., Ltd., the Kanegafuchi Cotton Spinning Co., Ltd., and various mills in the Isezaki, Hamamatsu, Gifu and Daishoji districts, all silk weaving centres. Inactivity in the export of Habutae turned the attention of weavers to the production of Fuji silk. The monthly output of Fuji silk to-day reached 40,000 pieces, and the activity of this class of weave has stimulated the whole silk weaving industry of Japan.

In weaving Fuji silk, British No. 135 yarn is used for the warp, and No. 65 for the weft. About 400 *momme* of No. 135, and 320 *momme* of No. 65, make 50 yards, one piece of Fuji silk. At current costs, with wages at 7 to 8 yen a piece, the cost per yard works out at about Y.1.16 to Y.1.17. Current market prices are from Y.1.18 to Y.1.20 a yard, leaving from 2 to 4 sen a yard profit, about Y.1 to Y.2 per piece. This is the reason why the old producers of *habutae* and other silk textiles for export have been tempted to manufacture Fuji silk.

Before the war there were only 106,500 spindles in the silk industry in Japan; now there are 187,700 owned by 18 companies. Plans for expansion now under construction will add 96,000 spindles to present equipments, making the total 283,700 spindles. The following table showing the plans for each of these 18 companies for expansion will indicate how the silk spinning industry is keeping its place in the textile industry of Japan.

(In this table "mules" are estimated in their efficiency as "spindles.")

Companies	Present equipment spindles.	Plans for extension spindles.	Total spindles
Kanegafuchi Boseki K. K. ..	60,078	—	60,078
Fuji Gas Spinning	62,042	15,600	77,642
Nihon Silk & Wool Spinning .	20,000	16,460	36,460
Nihon Silk Weaving	7,500	7,500	15,000
Nihon Silk & Cotton Weaving	5,400	3,540	8,940
Nihon Penni	3,000	15,000	18,000
Joshu Raw Silk	840	3,600	4,440
Taihei Cotton Spinning ..	920	1,080	2,000
Fukushima Cotton Spinning ..	—	3,000	3,000
Toyo Raw Silk	2,400	2,016	4,416
Katagura Gumi Raw Silk ..	4,000	—	4,000
Koriyama Cotton spinning .	5,640	—	5,640
Shinano Raw Silk	3,840	—	3,840
Tokyo Mousselaine .. .	3,000	7,200	10,200
Toyo Cotton Spinning ..	3,600	16,000	19,600
Nihon Silk Spinning	1,500	—	1,500
Nakatsu Raw Silk .. .	—	5,000	5,000
Omi Raw Silk	4,000	—	4,000
Total	187,760	95,996	283,756

The Chinese Eastern Railway

Data from Last Annual Report

Head Office: Harbin. *Officers and Board of Directors*: President and Director-General, Chin-Chun Wang, C.E., Ph. D., LLD.; Chinese Directors: Yu Jen-feng, Ho Shou-jen, Yuan King-kai and Chen Tulow; Vice-President, Danilevsky; Russian Directors: Koushetzoff, Poushkareff, Richter and Dissenky; General Manager, Ostroumoff; Assistant General Manager, C. T. Shar. *Cable Address*: "C.E.R." (in English); "Pravlenie" (to the Company in Russian); "Opravlenie" (to the Railway Administration Office in Russian).

History: The history of the Chinese Eastern Railway began in 1896, when the Chinese government invested 5,000,000 taels in the Russo-Chinese Bank to join its partnership. One particular enterprise that both the Chinese government and the Russian government had then in view was the construction of the Chinese Eastern Railway.

To relate the story more accurately, however, it must be said that the Russian government was more anxious to have the line than the Chinese government. For up to this time, Russia had been seeking for an ice-free port for her navy; but many attempts were frustrated. So she began to cast her eye on Port Authur and Dairen—two ice-free ports. In the meanwhile, she had just been building the gigantic Siberian Railway. It would shorten the distance between the continents of Asia and Europe in a still more amazing degree, if another line passing through the Chinese territory could be built to connect it. Therefore with motives primarily political and military, the Russian government interested the Chinese government in the construction of this line, and in September 1896, an agreement was reached between the Chinese government and the Russo-Chinese Bank. It was agreed that the financing of the railway should be undertaken by the Russo-Chinese Bank. A railway company separate from the Bank, called the "Chinese Eastern Railway Company," was established with shares of 5 million roubles as the initial capital to be sold only to Chinese and Russians. The Chinese government shall have the right to appoint the president of the railway, whose duty is to look after China's interests both in the bank and in the railway.

Dr. Chin Chun Wang, C.E., Ph. D., LLD.
President and Director General of the Chinese Eastern Railway

Harbin Station

Chinese Eastern Railway Administration Building at Harbin

By this agreement, the company is given by China a vast quantity of public lands along the railway free of charge or at reduced prices. The company is exempted from all kinds of duties on materials used by the railway, and all taxes on the lands that are used by the railway.

To reciprocate the many fold privileges that the company receives from the Chinese government, the agreement requires that beginning from its first day of operation, the railway should pay to the Chinese government five million taels, which, however, have never been paid yet. It was further agreed that all profits of the railway, after that part which is distributable to the shareholders, shall be applied to the redemption of the railway in behalf of China. After eighty years, the railway, together with all its movable and immovable properties, shall be returned to the Chinese government without any cost, and with all its debt to the Russian government being cancelled. The Chinese government also reserves the right to redeem the whole line at cost after thirty-six years.

The whole line, as provided in the agreement, must be completed in six years. The construction of the branch line, called the South Manchuria line, giving Russia an access to ice-free ports, Port Authur and Dairen, started two years later. Thus this line enabled Russia to penetrate into the three eastern provinces and procure two strong naval bases. But this precipated the Japanese-Russo war, as a consequence of which the South Manchuria line was yielded to Japan.

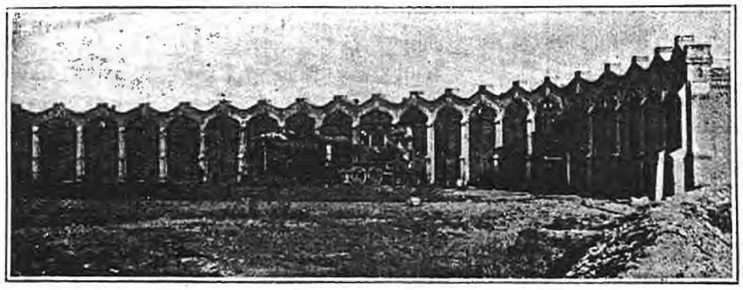
It is important to note that the management of the railway was wholly in the hands of the Russians, who bad a definite policy of colonization. For some time, a large army was kept on the line, contrary to the original agreement. Expenses, having nothing to do with the railway, were charged to the line, though actually paid by the Russian government. Curious to say that the Chinese government, though invested in the right of appointing a president, did not exercise this right except once at the beginning, and then until recently.

The outbreak of the world war, however, brought about

C.E.R.: Main Shops at Harbin

C.E.R.: Round House at Progranichnaya

great changes. The breakdown of the Russian government suddenly left the Chinese Eastern Railway in a most precarious position. In order to help the line financially and technically, the allies, as a temporary measure, formed the inter-allied technical board. At this critical juncture, China, having the sovereign rights over this territory wherein lies the railway and considerable financial interests in the railway as shown above, and being the sole partner of Russia in the enterprise, naturally stepped in to give help to the railway. An agreement was concluded between the Chinese government and the Russo-Chinese Bank, representing the shareholders, in 1920. By this agreement, the Chinese government is given the temporary responsibility of supervising the line. At present, the railway is being run under the provisions of the 1920 agreement. By this agreement, China only asserted some supervisory power, by adding four members into the board of directors, thus making the member-



C.E.R.: Round House at Hailar

C.E.R.: Station and Yards at Manchuli

ship of this supervising body half Chinese and half Russian. As it requires seven votes to pass anything, neither the Chinese nor the Russians can decide anything without the approval of the other. As to the actual management, practically nothing is changed. The whole executive power still rests in the hands of the general manager, who is a Russian nominated by the Russo-Asiatic Bank. So all the change that has been made is that China has taken one-half of the supervising power into her hands, while leaving everything else still in the hands of the Russians.

Location and Extent: This line lies in the heart of the three Manchurian provinces and links Asia and Europe together. At its northwest extreme, it connects the Siberian Railway at Manchuli, the last station in Chinese territory. At its east extreme, it connects Vladivostok. A branch, connecting the South Manchuria line, runs from Harbin to Changchun; from there connection is made to Mukden, to Peking, to Dairen and to Korea. The length of the main line is 1726-83 kilometres, and that of its branch is 480-17 kilometres. The whole line is surrounded with fertile agricultural fields, grazing lands and rich mineral resources.

C.E.R.: Express Train at Harbin

Organization: The whole organization broadly speaking consists of the president's office, the company, and the railway administration. At the head there is a director-general of Chinese nationality, appointed by the Chinese government to oversee the management of the railway, and look after China's interests in the enterprise. In the president's office, the work is divided into four sections and supervised by the chief secretary and the counseller.

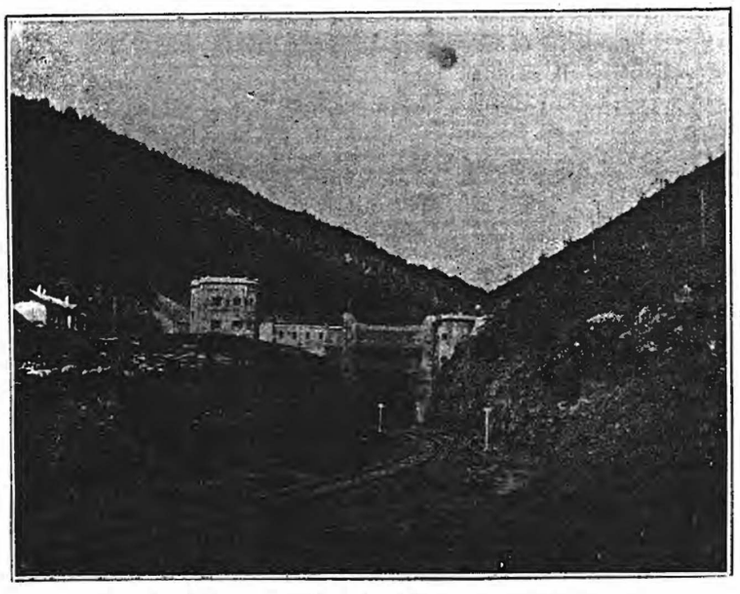
The company is the law-making organ, consisting of the board of directors and board of audits. There are nine directors, four of whom are Chinese, appointed by the Chinese government. The other five are Russians. The Chinese director-general is the *ex-officio* president of the board of directors. The board decides the general policies of the railway. Measures of the board of directors cannot be legalised unless approved by seven votes. The detailed work of the board is performed by three departments: General administration, financial department, and technical department. Besides, there is a board of audits, which has five members, two of whom are Chinese appointed by the Chinese government, the other three members being Russian. The chairman of the board must be of Chinese nationality. This board examines and audits the financial records and transactions of the railway.

The railway administration has the special charge of the running and management of the railway. I is the most importans in that it has the whole management of this railway in hand. At the head, there is a general manager of Russian nationality who it the chief executive. His powers are ample and extensive. He practically runs the whole show. Besides, there are a Chinese assistant general manager and two Russian assistant general managers assisting him. This office has some twenty departments such as: General administration, legal department, accounting department, mechanical department, traffic department, business department, engineering department, materials department, navigation department, secretarial department, telegraph department, printing department, auditing department, pension department, land investment department, medical department, education department and veterinary department. The heads of these departments are Russians. But recently several important departments

such as accounting, operation, commercial, mechanical, engineering, materials and land departments have added Chinese assistant chiefs. All these chiefs and the subordinates are under the general manager, who practically has the power of appointment and discharge over them.

Character of Traffic: The transporation revenue for 1921 was 39,785,677.19 roubles. Of this sum, the freight receipts forms a greater part than the passenger receipts. The freight, broadly speaking, consists of agricultural products, livestock, lumber and minerals. The total amount actually transported on this line for 1921 was 126,149,527 poods (Russian standard of weight equal to 29 catties, or 40 pounds) Agricultural products usually furnish the largest part of the freight. For instance in 1920, of the freight, 58 per cent. was agricultural products; 32 per cent. lumber; 10 per cent. mineral; and 1 per cent. livestock. Agrieultural products include wheat, grain, flour, bean, beanoil and bean cakes.

C.E.R.: The Spiral Climb over the Khingan Mountains



Fortified Tunnel at Hing An (Khingan Mountains)

The freight service handles, of course, goods exported as well as goods imported. Imported goods handled by this line consist chiefly of salt, iron wares, manufactured articles, petroleum, cement and sugar. For the year 1921, the figures are as follows:

Salt	1,826,000	Poods
Iron wares	1,240,000	,,
Manufactured articles	1,062,000	,,
Fruits	764,000	,,
Petroleum	415,000	,,
Cement	492,000	,,
Sugar	715,000	,,

EQUIPMENT

Locomotives: Locomotives 536.....434,867 horse power.

8 *Wheel Passenger Carriages*:

Special carriages	15.....	150	passenger capacity
First-class carriages	30.....	660	,, ,,
Mixed ,, ,,	23.....	598	,, ,,
2nd ,, ,,	30.....	960	,, ,,
3nd ,, ,,	51.....	2,448	,, ,,
Mail ,, ,,	11.....	66	,, ,,
Baggage ,,	15.....	210	,, ,,
Dining car	18.....	210	,, ,,

4 *Wheel Passenger Carriages*:

Special carriages	79.....	395	passenger capacity
Mixed	23.....	460	,, ,,
1st Class	23.....	368	,, ,,
2nd ,,	72.....	2,160	,, ,,
3rd ,,	193.....	9,264	,, ,,
4th ,,	51.....	1,632	,, ,,
3rd ,, mail carriage	7.....	112	,, ,,
Baggage cars	24.....	120	,, ,,
Prisoner carriages	18.....	756	,, ,,
Health	15.....	150	,, ,,

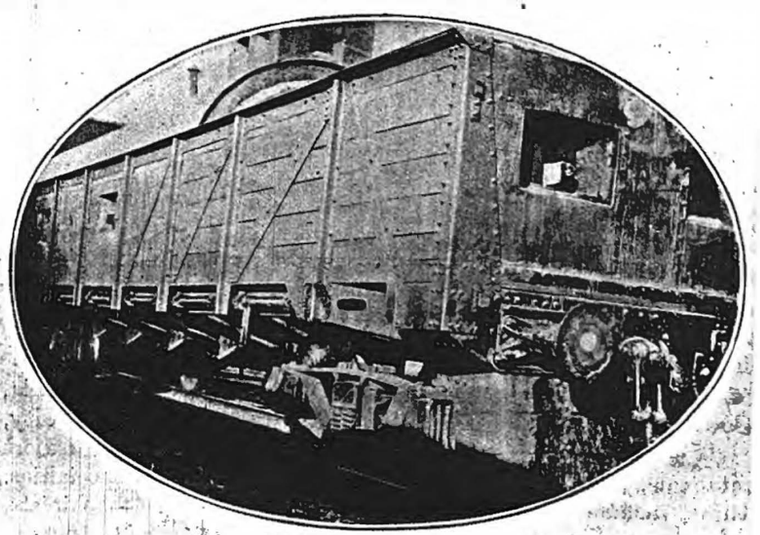
Freight Cars: 10,626 freight cars of 222,252 tons capacity including:

Russian style wagons	5,289.....	84,624	Tons capacity
American ,, ,,	860.....	16,770	,, ,,
Covered ,,	418.....	18,183	,, ,,
Common ,,	3,542.....	95,732	,, ,,
Ice ,,	169.....	3,834	,, ,,
Oil ,,	295.....	3,835	,, ,,
Special ,,	53.....	742	,, ,,

Depôts: Depôts containing back shop and roundhouse and doing car repairs and light and running locomotive repairs are as follows:

Harbin: Hengdaohotze: Pogranitchnaya: Tsitsikar: Pukedoo: Hailar.

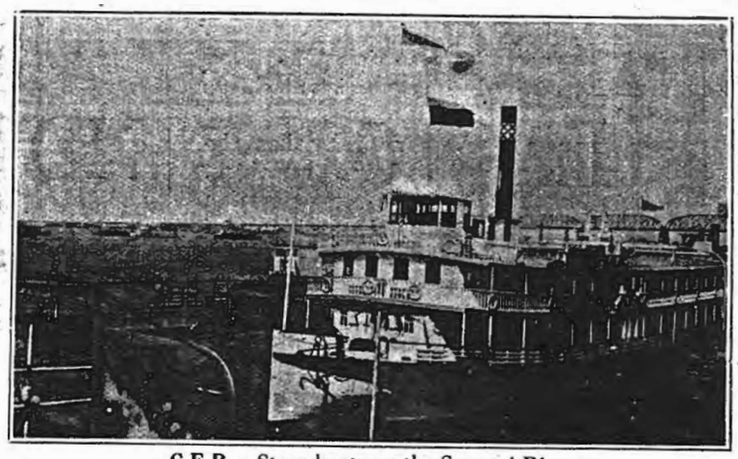
Main Shops: Harbin main shops consist of the following:— Old iron foundry: new iron and steel foundries: shops: black



C.E.R.: Armored Car

C.E.R. : Bridge over the Sungari River at Harbin

smith : machine : wheel : boiler : tube : erecting : tender : depôt : passenger car : freight : saw mill : power station : chemical testing laboratories.



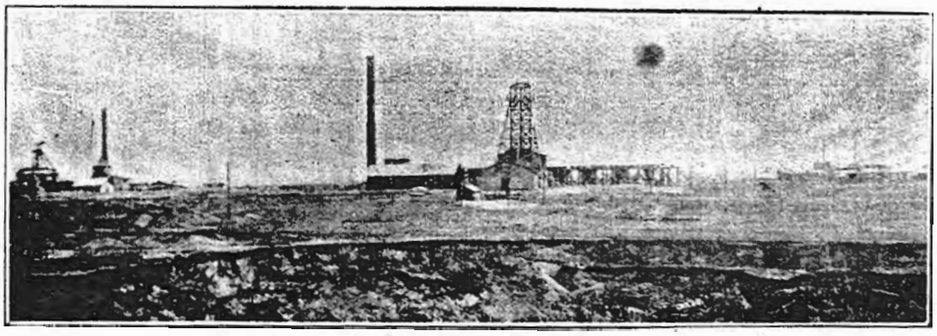
C.E.R. : Steamboats on the Sungari River

INCOME AND EXPENSES OF THE CHINESE EASTERN RAILWAY FOR THE YEAR ENDING DECEMBER 31, 1921.

	Roubles	Roubles
Transportation revenue	39,785,677.19	
Transportation expense		32,420,216.40
Directorate		1,100,019.61
General administration ..		6,285,080.61
Maintenance of way and works		5,685,023.64
Traffic and running		3,737,867.72
Maintenance of equipment ..		12,234,005.87
Interchange of rolling stock ..		30,349.98
Emergencies		2,830,562.33
Additions and betterments ..		544,306.64
Special revenue (Per special budget)	2,120,124.99	
Special expense (Per special budget) ..		6,450.023.77
		*3,035,562.01
	41,905,802.18	41,905,802.18

C.E.R. : Near Progranichnaya

The Inter-Allied Technical Board : The inter-allied technical board, represented by the United States, England, China, France, Italy, Japan and Russia, was organized in the winter of 1918. The reasons for organizing this board were various, among which one was to give the Czechoslovacs transportation facilities to join Russia to fight against Germany, and the other was to transport allies' troops to Siberia to maintain order there. At that time the allied nations were particularly anxious to protect the Siberian Railway and the Chinese Eastern Railway, in order to make the communication between Asia and Europe uninterrupted. During the course of the great war, many allied troops were actually transported on this line, and the board rendered some valuable services. But the board was originally intended for a war measure. And it is provided in the agreement that the board shall be dissolved as soon as allied troops should be withdrawn. Now their troops have been withdrawn except a part of the Japanese troops.



C.E.R. : Jalainor Coal Mines

* Profit.

Drop Forged Specialties

J. H. WILLIAMS & CO., LIMITED, of St. Catherines, Canada, with export office at 21 State Street, New York City, have ready for distribution a new and complete export atalogue, showing their lines of superior drop-forged specialties. hese include hand hammers of all kinds—nail, machinists, inners, riveting, plow, blacksmiths—and the following wrenches : tillson (wood and steel handle patterns) screw or monkey wrenches (3 patterns), automobile and bicycle wrenches and adjustable "S" wrenches.

The book is well illustrated and gives full particulars of all the bove goods—dimensions, list prices, etc. ; copy will be gladly funished on request.

J. H. Williams & Co., Limited, is the Canadian branch of J. H. Williams & Co., Brooklyn, Buffalo and Chicago, U.S.A., London Office, 56 Ludgate Hill, E.C.4, widely known as manufacturers of drop-forged wrenches and machinists' tools, including the "Agrippa" and "Vulcan" brands.

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

NEW COTTON MILLS IN CHINA

Manufacturing in Manchuria

River Improvements in Japan

Petroleum in Borneo

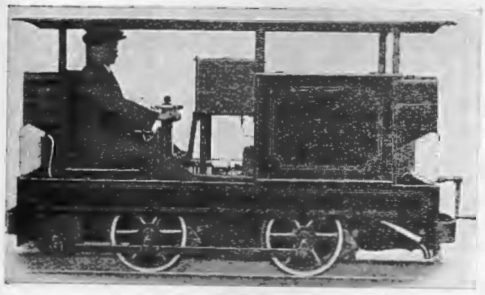
F. M. S. Railways & Map

Bridge Construction in China

The Nishihara Loans

Vol. XIX February, 1923 No. 2

SHANGHAI, PEKING, TOKYO AND MANILA



Contractors to: **The Admiralty, The War Office, The India Office, The Crown Agents for the Colonies, Colonial and Foreign Governments**

Internal Combustion Rail Cars, Inspection Cars, Coaches, Tramcars, Trailers, Locomotives, Tractors, etc.

British built throughout and supplied to upwards of 200 Railways in all Parts of the World

Designs to meet individual requirements

Passenger Freight Shunting | Mining Harbours Docks | Plantations Logging Contractors

The Drewry Car Co., Ltd.

(and McEwan Pratt & Co., Ltd.)

13 South Place, London, E.C. 2

Telegrams: "Effervesce, London"

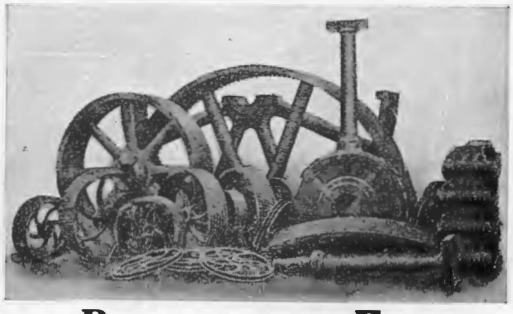
Works: Burton-on-Trent, England

ASHTON FROST & CO., LTD.

ESTABLISHED 1873.

MAKERS OF

STEAM ENGINES,
MILL GEARING,
DEEP WELL PUMPS,
SEWAGE PLANT,
ETC.

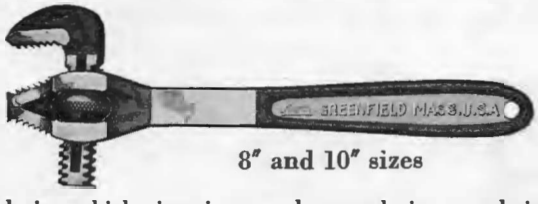


TELEGRAMS: "FOUNDRY."

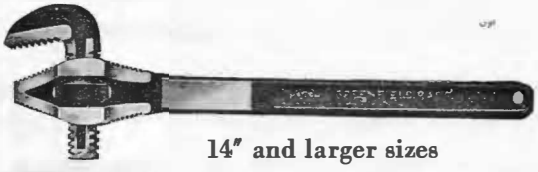
WORKS: **BLACKBURN, ENG.**

Little Giant—The New Pipe Wrench

"THE WRENCH WITH THE ORANGE HANDLE"



8" and 10" sizes



14" and larger sizes

A new design which gives increased strength, increased simplicity, increased usefulness, *less* weight, and fewer parts.

The "*Little Giant*" Pipe Wrench has become popular at once because of the end opening jaws. It can be thrust straight on a pipe like a pair of pliers, and will be found useful in places which are beyond the reach of an ordinary pipe wrench.

The arrangement of the jaw, which can be engaged at will with 2 or 4 sets of teeth on the handle can be seen in the picture. These extra sets of teeth mean long life. The "*Little Giant*" Wrench is drop-forged and heat-treated throughout.

Merchants will be particularly interested in the light weight (less than an ordinary pipe wrench) and the few parts. The "*Little Giant*" has only 3 parts, which means a smaller investment in replacements. Any of our representatives will be glad to quote prices.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

Canadian Plant: Greenfield Tap & Die Corporation of Canada, Limited, Galt, Ontario.

Cable address: "Getede"

REPRESENTATIVES

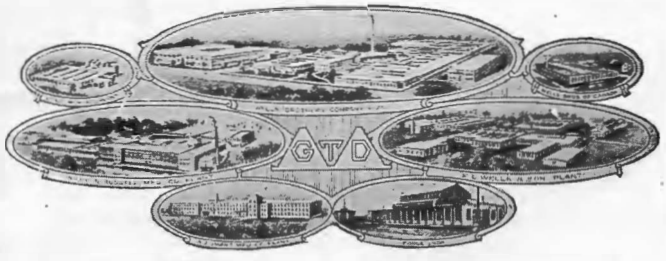
JAPAN.

MULLER, PHIPPS & SELLERS, LTD.
17 Itachibori Kitadori 5-chome, Nishi-Ku
Osaka, Japan
Fudo Bank Bldg., 9.2-chome
Honkokucho, Nihonbashiku
Tokyo, Japan

HORNE COMPANY LTD.
6-7 Takayama-cho
Kyobashi-Ku
Tokyo, Japan

CHINA.

MULLER & PHIPPS (CHINA) LTD.
5 Ice House St.
P. O. Box 25, Prince's Bldg., Hongkong, China
2 Canton Road
Shanghai, China



Plants of **GTD** *Corporation, World's Largest Manufacturers of Screw-threading Tools*

panese bank after the loans being repudiated, the facts as losed by the *Peking Daily News*, would seem to place this ter squarely up the other foreign banks operating in China, their governments. The Chinese official organ says in effect the foreign banks in China are receivers of stolen goods, a grave accusation.

The names of these officials concerned in the Japanese loan otiations are no secret, neither should it be difficult to trace names under which the deposits are held in the foreign banks. a rather large sum of money to conceal effectively. Admittedly, Chinese received the money and hastened to place it in safe es outside the jurisdiction of their government, secure from iscation. The Japanese lenders, however, received nothing a worthless piece of paper in return. They were simply fleeced time of great international stress by a gang of official confidence who took their money for specific purposes, failed to live up heir agreements and their successors in office who were not on the graft repudiated the transactions. And although the of the money so stolen is still reposing quietly in foreign banks wing interest (which is probably being divided with the new g in power) the Japanese lenders have disbursed Y.40,000,000 late to sustain the credit of China and protect their clients! he Chinese have their way, they will repudiate altogether these s most honorably contracted without any attempt to bring corrupt officials to the bar of justice or take steps to have the s recovered and returned to the treasury where at least a tion of the amounts can be returned to the Japanese donors.

On the part of Japan, these loans were eminently urgent and ified by the exigencies of the military situation. Terauchi d wisely and well from the standpoint of a power called n to protect itself by bolstering up an impecunious neighbor ally whose weakness and unpreparedness constituted a ace to the very existence of the empire entrusted to his care lefend. The series of above mentioned three bank loans stand a par with the obligations of other allied nations to America Great Britain. Japan advanced the sums demanded by the ese for certain railway concessions. Through the jealousy of powers, she was afterwards denied the right to enjoy these cessions and coerced into surrendering them to the consortium. aking over the Manchurian, Mongolian and Shantung lines with r advances of Y.40,000,000 the powers are morally obligated upport Japan in demanding that the interest and principal on e advances be paid. Otherwise, after depriving her of the usive enjoyment of the concessions by forcing their inclusion the consortium pool, they are simply aiding and abetting na in repudiating her just obligations.

If the Japanese loans are repudiated on the flimsy pretexts forth by the present Peking government and no attempt made ompel the former corrupt officials to disgorge, while American other loans which are in the same category as the Nishihara sactions are recognized and paid, a great wrong will be commit-

The three Japanese official banks faithfully discharged their gations to their government at its express invitation. They d not refuse any more than any patriotic American or British k would have refused a similar invitation to assist its govern- t during the progress of a great war. In supporting their ernment to finance the war participation pact and make Sino- anese military co-operation possible, they were rendering a great ice to the allied cause, a service that all other nations shirked r China had been prodded into declaring war against Germany. l enemy influence in Siberia spread and the peace of China and an menaced in Manchuria, the construction of the Taonan- ol, Kirin-Hueining and the other Manchuria lines would have matically become an immediate strategical necessity. There no time to lose, and the situation permitted of no haggling or drawn out negotiations. When viewed from this angle, uchi demonstrated that his knowledge of the Asiatic military ation was on a par with Foch's grasp of the problem on the tern front. Because a few rabid anti-Japanese foreign diplomats and propagandists playing to the Chinese gallery started a violent campaign to discredit Japan, the world accepted their viewpoint and Field Marshal Count Terauchi was held up to scorn and his motives impugned because he had the foresight to see ahead and prepare against all emergencies in the part of the world entrusted by the allies to his defense.

It is not our intention to analyze all the Nishihara loans at this time. Our immediate purpose is to throw light on the legitimate transactions of the three banks which acted merely as the agents of their government to forward its plans for the successful prosecution of the war in territories of an ally utterly incompetent to defend its own interests, and by reason of its insolvency and military weakness a grave menace to the success of the allied cause. The transactions of the three banks in the matter of the Manchurian and Mongolian railways and the war participation loan are as much a part of world war finance for the good of the common allied cause as any of the American loans to Europe, obligations that although difficult perhaps to meet at the present moment, are held by all parties concerned as sacred. The obligations of China to Japan are of special importance from the fact that after practically forcing China to declare war against Germany, she was refused financial assistance by the United States in order to enable her to fulfill her part in the struggle. The time arrived when conditions in Siberia demanded prompt action, and when America declined to advance the funds, Japan stepped into the breach, and took over the burden. In lending money to China at a time when other powers could not or would not advance the funds, Japan acted in self-defense, and incidentally furthered the cause of the allies. The mere fact that Japan was lending money to China when all others could not, seemed to indicate an intention on her part to dominate the country. The others turned on her.

There may have been, as alleged, fifty thousand ulterior motives in the mind of Terauchi when he ordered the official Japanese banks to carry out his instructions, but the great fact will remain that his action was most praiseworthy and when viewed from a proper angle in relation to world events and Japan's duty in Asia, of incalculable value to the allied cause, and of supreme vital importance to the safety of Japan and China, which after all, was Terauchi's first concern.

Any formal announcement on the part of the Chinese government that these loans are illegal and are to be repudiated because of non-approval of parliament, failure to exact guarantees or to supervise the expenditures, must of a necessity strike at the legitimacy of all her foreign loans of the republican period, many of which, by comparison, are in the same category. The principle underlying the negotiation of the American and Japanese loans is identical. If one is legitimate so are the others. If one is repudiated, so must the others be. The interests of American and Japanese bankers are the same.

Another Railway Loan

Another secret railway loan has been unearthed, according to Peking vernacular papers. Some time ago, the story runs, Mr. Kao En-hung concluded a loan with the Belgian-Netherlands Bank amounting to 30 million dollars on the security of the Sian-Kuanentang section on the Lung-Hai Railway, and received a sum of $1,250,000 out of 1½ million dollars to be advanced. Later, Mr. Kao changed the security, substituting the Chingsi-Paotou section on the Peking-Suiyuan line for the section above mentioned, on account of which the syndicate refuses to hand over the balance of the advance, amounting to $250,000. Members of parliament headed by a certain Mr. Chien brought forth a questionnaire demanding that Mr. Kao En-hung reply within three days whether he concluded such a loan, it being taken for granted that Mr. Kao is guilty of the charge if no answer is forthcoming within the stipulated period.

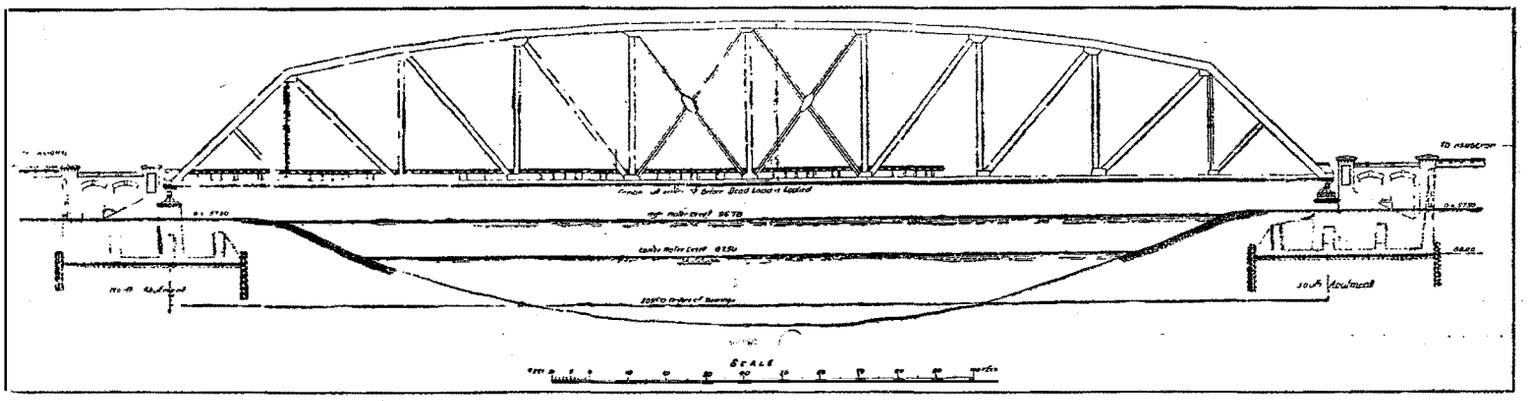


Fig. 3.

Construction of a 305-Foot Span Railway Bridge

By E. T. Forestier, A.M.I.C.E.

Paper Read Before The Engineering Society of China

THE following is a short description of the design and construction of a through steel railway bridge of 305-ft. span which carries the Shanghai-Hangchow-Ningpo Railway over the Lo Tien Wan creek, a branch of the Whangpoo river, 38 miles from Shanghai.

The new bridge, which up to the time of writing is, the author believes, the longest simple span bridge at present in China, replaces a bridge of two spans of 104-ft. each, the substructure of which was in a precarious condition and had been condemned owing to scour in the bed of the creek near the centre pier. The condition of the

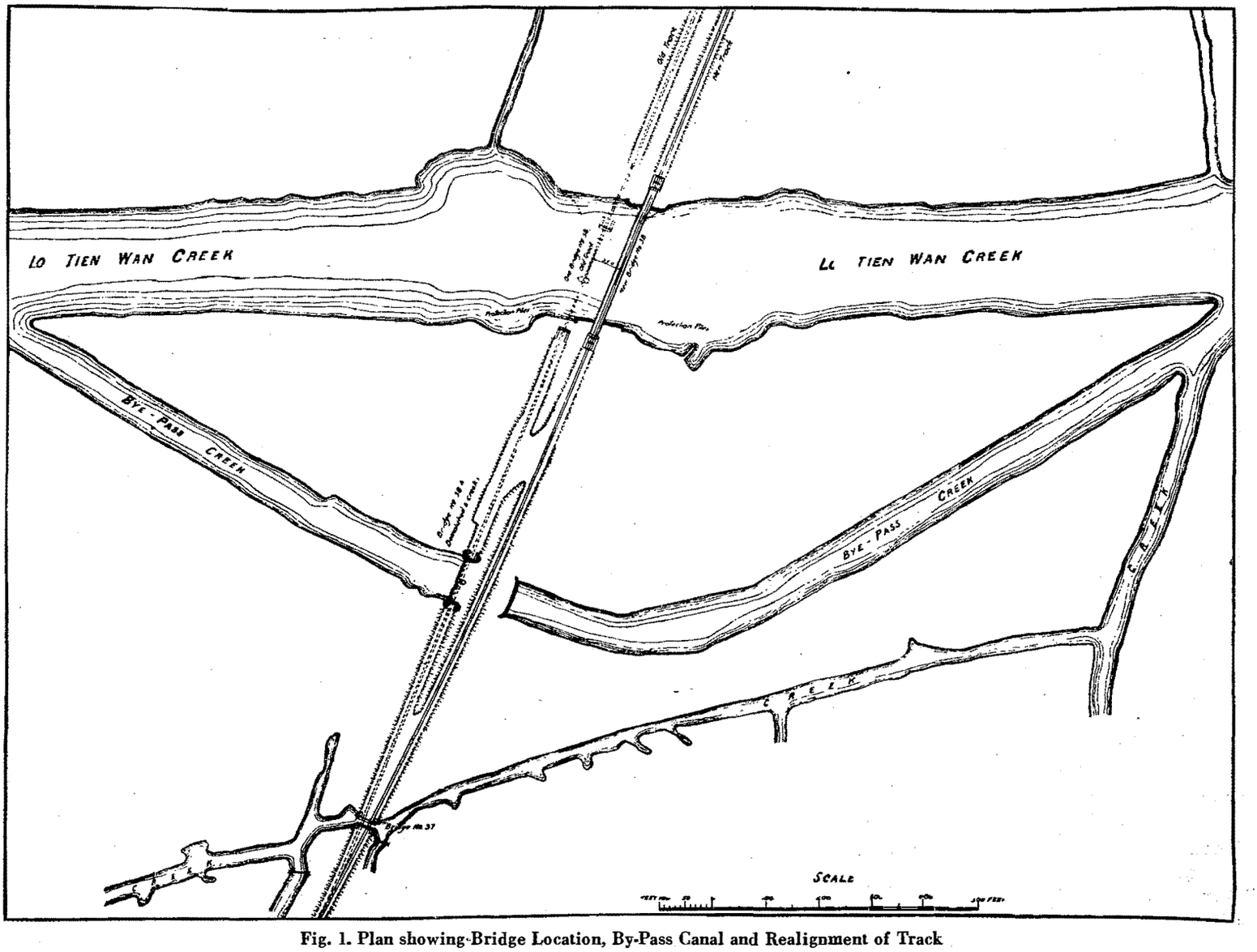


Fig. 1. Plan showing Bridge Location, By-Pass Canal and Realignment of Track

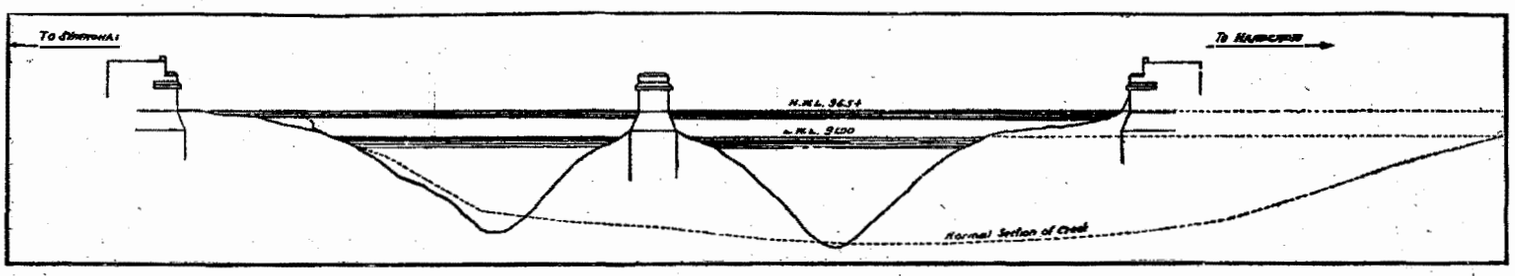


Fig. 4. Section on Centre Line of Old Bridge

old bridge, which was constructed by Chinese engineers twelve years ago, forms a very good object lesson in the dangers which are bound to arise by the restriction of a natural tidal waterway.

On referring to Fig. 4 it will be seen that the area of the cross section of the actual waterway along the centre line of the old bridge is very much smaller than the normal cross section of the creek, in fact it is only about 41 per cent. of the latter and, as the creek is tidal the velocity of the current under the bridge was very considerable.

In addition to this, the centre pier of the old bridge was not built in a line with the stream, but placed at right angles to the centre line of the bridge which crossed the creek on the skew. This caused the current to be deflected towards the bank and resulted in the bank being washed away, the erosion taking a semi-circular shape which gave a circular motion to the water and caused a whirlpool to be formed. The creek being tidal this occurrence took place both at ebb and flood tides and the effect was the same on both the up stream and down stream sides of the bridge, although more intense on the latter side. Fig. 1 illustrates this and shows how the banks were eroded by the whirlpools which were formed.

Not only were the banks of the creek damaged, but, what was much more serious to the safety of the bridge, the whirlpools scoured craters in the bed of the creek 77-ft. deep on the down stream side and 40-ft. deep on the up stream side, measured at high water. It was the former scour which caused the danger to the pier, as the latter was just at the edge of the crater.

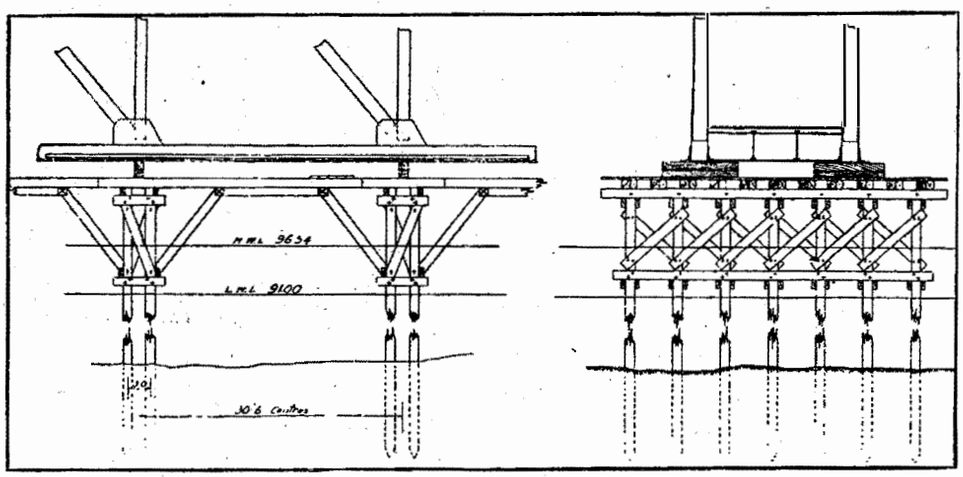


Fig. 5. Detail of False Work

It was not long after the old bridge was completed that the Chinese builders realized the mistake which had been made in restricting the waterway, and a canal to act as a by-pass, and so relieve the main stream, was excavated round the bridge on the north side, see Fig. 1. The relief given by this by-pass was, however, very small, if not negligible, as was subsequently shown after it had been stopped up by the new bank which was constructed to carry the new track diversion. After considering several schemes it was decided to construct a new single span bridge 55-ft. away from the old bridge and measuring 305-ft. span between centres of bearings. This necessitated realignment of the track for some distance, but this work presented no difficulty.

Substructure.—On account of the very bad nature of the foundation, the abutments of the new bridge, due to the heavy load they have to carry required special consideration, the ordinary mass masonry type of bridge abutment being out of the question as its own weight, in order to distribute the load over a sufficient area, would have been excessive. It was natural, therefore, that a reinforced concrete raft abutment was adopted.

The load on the foundation is made up as follows :—

Superstructure—		
Steelwork, etc.	253 tons	
Train load	400 ,,	
		653 tons
Substructure		707 ,,
		Total 1,360 tons

The allowable bearing pressure employed is 1,200-lbs. per square foot and, in order that the average pressure, *i.e.*, the total weight divided by the bearing area, should not be more than this amount, the size of the foundation was made 52-ft. by 47-ft. In addition the foundation is piled with 12-in. square piles 40-ft. long staggered at 4-ft. centres to provide for the eccentric load ; also, the edges of the foundation are piled with sheet piling 5-ins. thick and with guide piles 10-ins. square, both 30-ft. long. All piling is of Oregon pine.

As the foundation was particularly bad it was decided to try and consolidate the ground by driving the sheet piles first and the 12-in. bearing piles afterwards. This, however, did not work out in practice, because when the bearing piles were being driven the sheet piling was bellied outwards, and after the latter had gone as far as its flexibility permitted, the earth contained within the foundation was forced upwards. In view of the results obtained with the method adopted in piling these two abutments and also experience on other work in this part of the country, the author is satisfied in his own mind that it is impossible to consolidate the ground more than what it is in its natural state, by any such means as just described. The author, however, wishes it to be distinctly understood that he refers only to the ground below what might be termed " the level of permanent saturation ; " also, that these observations apply to the silt as usually found in the Yangtze valley flats.

Above the level of permanent saturation it is quite possible to consolidate the ground, and excessive settlement of a structure whose foundations do not reach to this level is probably nothing more or less than the compressing of the ground above this level.

The author is strongly of opinion that while the bearing pressures usually adopted in Shanghai may be satisfactory when applied below the saturation level, they are far too high when applied to the soil above this level, and that for important structures it is essential to carry the foundations below this level ; also, he is of the opinion that the allowable bearing pressure of 1,700-lbs. per square foot usually employed in Shanghai is too high if employed

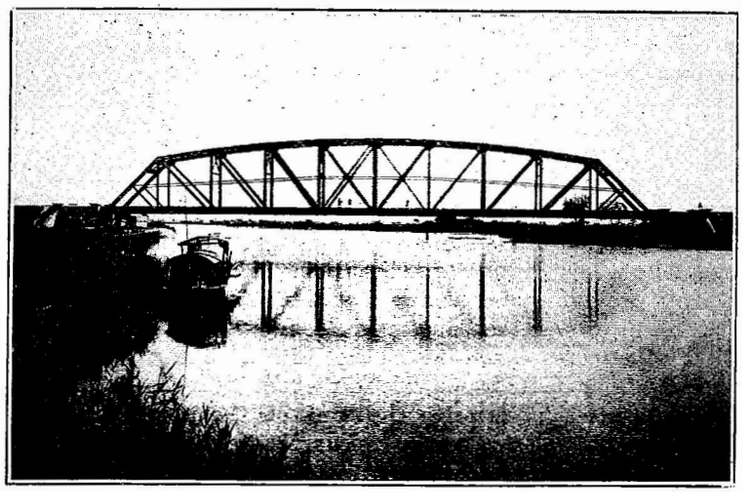


Fig. 6. Bridge No. 38

without piling. As already mentioned, the pressure worked to was 1,200-lbs. per square foot, which is the maximum pressure employed by both the Shanghai-Hangchow-Ningpo and the Shanghai-Nanking Lines, but even so no important structure is usually erected without the foundations being liberally piled, and results have shown that this practice is sound, as settlements have been small and of no account. More trouble, however, has been experienced with abutments sliding than settling, and a pair of abutments, which were a record as far as sliding was concerned, were also a record as far as settlement was concerned, in so far that after they had moved the settlement was hardly measurable.

The shoes of the bridge rest on two pedestals which form part of two main inverted cantilever ribs, 3-ft. thick. These main cantilevers are connected together and distribute the load to four cross beams, which in turn distribute the load to the main slab. The cross beams, as will be seen from the diagram, are in the form of beams supported at two points with cantilever ends, the points of support being the main cantilevers. It will be noticed that the lengths of the cantilevers of these cross beams are rather long in proportion to the middle part, and consequently the advantage of continuity is not fully obtained, in fact, the moment in the centre part is a negative moment. This is unavoidable as the distance apart of the main cantilever ribs is governed by the distance apart of the main girders. The upper part of each main cantilever is merely a wall supporting the concrete cross beams which carry the track on the abutment, and which for lightness and appearance, is made in the form of two arches. The wing walls are thin reinforced curtain walls going only 1-ft. below ground level and are make monolithic with the abutment at the high end and at the low end supported by a pillar resting on the end of the rear cross beam. This design was adopted, in preference to carrying the wing walls down to the foundation slab, as it is of lighter construction, and the question of reducing dead-weight was the governing factor of the design.

Horizontal struts are provided between the cross beams supporting the track to allow for the side bending moment which is introduced in these beams by the longitudinal force created by the sudden application of the train brakes.

All main reinforcing steel is of 1-in. square rib bars while $\frac{3}{4}$-in. square bars are used in the floor slab, all minor shear reinforcement, etc., is of $\frac{3}{4}$-in. diameter indented bars. Altogether there are about 26 tons of reinforcing steel in each abutment. The stresses used in the steel and concrete are 16,000-lbs. and 600-lbs. per square inch respectively, and the concrete is of 1 : 2 : 4 mix.

Levels taken about two years after the bridge was finished, indicated a maximum settlement of 1.20-ins.

Superstructure.—The girders have curved upper chords with N type web member bracing and call for no special comment. A good idea of the bridge can be obtained from Figs. 3 and 6.

A few remarks regarding the falsework, however, may be of interest. Fig. 5 shows a typical cross section of the falsework which, as will be noticed, is rather substantial and had to be on account of the depth of water and the soft nature of the creek bed for several feet down and which was liable to cause excessive settlement due to the weight of the steelwork, a rather serious matter in the case of a large bridge on account of the difficulty of jacking up. Events subsequently showed that the number of piles in the bents was by no means excessive, as just before the girders were closed in the middle, a gang was employed doing nothing else but jacking up the panel points. The settlement, however, was not excessive, and was kept in check by the jacking gang without difficulty, although the full camber as provided by the design, was not quite obtained, but the last middle section of both top chords entered without difficulty. However, there was not a sixteenth of an inch to spare. The length of the longest piles used for the falsework was 68-ft., they were 12-ins. square and, of course, had to be spliced. Another reason for making the falsework substantial was in order to withstand the wind pressure on the bridge before the structure had been closed, and also the side pressure caused by the flow of the water. The height of the girders is 43-ft. in the centre, and the distance from the top of the falsework to the creek bed about 49-ft., therefore making the highest point about 92-ft. above the bed of the creek.

After the new bridge was opened to traffic the steelwork of the old bridge was removed and the centre pier and south abutment blown up and reduced to 5-ft. below low water and the creek widened on the south side to its normal width.

Fig. 8. Removing Span of Old Bridge No. 38.

The old deck span was easily landed, but the through span required considerably more work. Two native boats of about 50 tons capacity were floated underneath and falsework built up on these. Due to the tides not being high enough to balance the displacement, it was not until the third attempt that the bridge could be floated, but on this occasion the tide was at its highest and the shoes cleared by about an inch, which however, was sufficient to float it out. Fig. 8 shows the span being floated out.

Anzan Cement from Slag

The results of technical tests held over samples of cement manufactured from the slag produced at the Anzan Iron and Steel Works, by the experts of the central laboratory, Dairen, and also the Anzan Works have shown that, in pulverization, expansion, and tensile power, etc., Anzan cement is found to compare favourably with Portland cement, as demonstrated by the use of over 200 barrels thereof.

In passing, the annual consumption by the S.M.R. Co. alone averages 300,000 barrels.

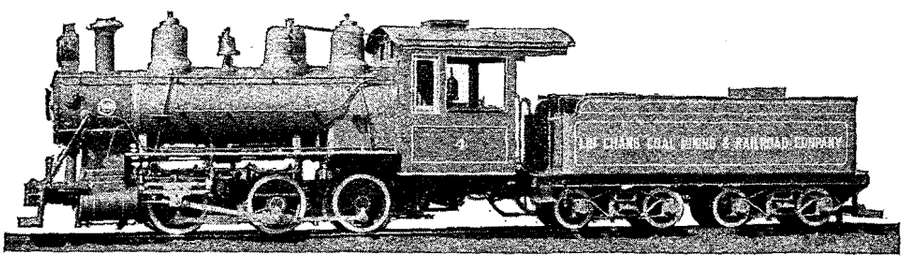
Cement-manufacturing promises to be another lucrative enterprise for the Anzan Works.

The current quotation is Y.4.60 per barrel in 3 bags for delivery at Lishan station. Each bag being bought back for 20 sen each, the net price is Y.4 per barrel, which is very moderate.

BALDWIN

Six-Wheeled Switchers

Baldwin Locomotives of this type give ample power for mining and light contracting work



BUILT FOR LIU CHANG COAL MINING & RAILWAY CO., CHINA

Gauge 2 feet 6 inches
Cylinders, 12 x 16 inches
Working pressure, 160 pounds
Fuel, coal
Driving wheels, diameter, 33 inches
Weight, engine, 40,700 pounds
Weight, engine and tender, 76,000 pounds
Service, switching

WHERE working conditions call for narrow gauge and light track, the switching locomotive illustrated is one which will give ample power to meet all requirements. Although built for mining service, this six-coupled locomotive built for the Liu Chang Coal Mining and Railway Company, represents a type which is adaptable for general contracting purposes either for long or short hauls. Easy on tracks and over light bridges.

We can accept orders from any part of the world for these industrial locomotives and will build either to specifications furnished, or in accordance with any of our own designs and specifications.

We ship direct from our own plant to any destination. Our nearest representative will forward any information desired or co-operate in the selection of types of locomotives to meet any operating conditions.

OFFICES:

J. M. WRIGHT, Bandoeng, Java, D. E. I.
J. W. KELKER, Harbin, Manchuria

AGENTS:

ANDERSEN, MEYER & CO., LTD., Peking and Shanghai
SALE & FRAZAR, LTD., Tokyo and New York

RESIDENT TECHNICAL REPRESENTATIVES:

R. E. McFalls, Peking, China
E. P. Williams, Fr., Shanghai, China
J. F. Greig, Tokyo, Japan

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA, U.S.A.
Cable Address: "Baldwin, Philadelphia"

914

LOCOMOTIVES

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING COMMERCE FINANCE

CHINESE ENGINEERING DEVELOPMENT

Purification of Water

Recent Electrical Development in Japan

Petroleum in Borneo

Public Works in the Philippines

Far Eastern Motors.

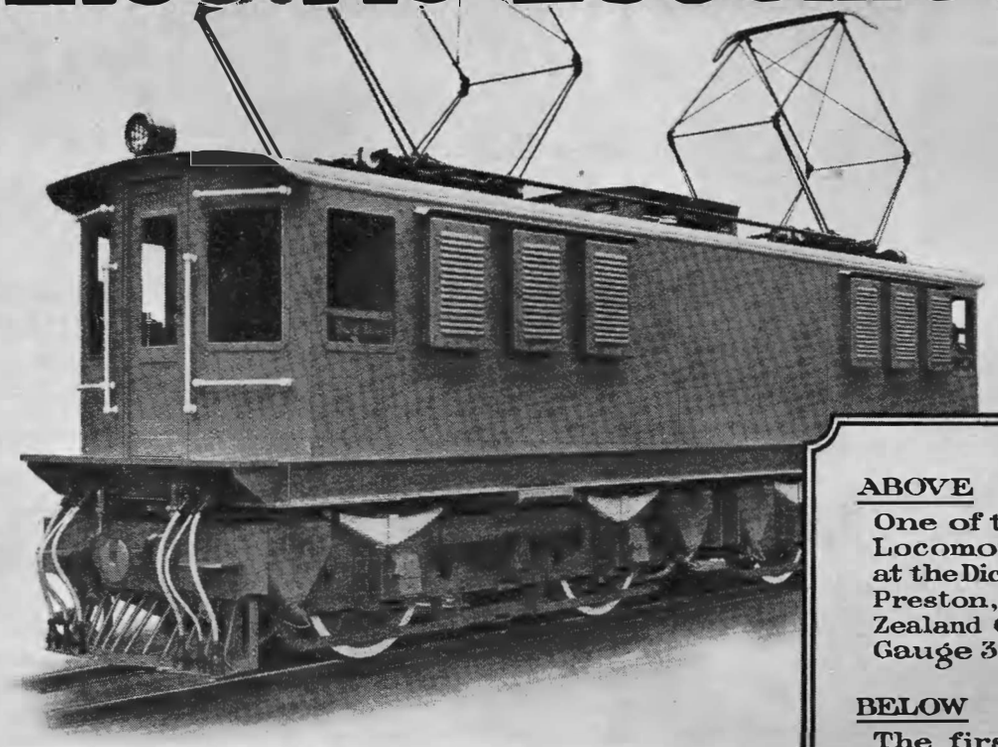
上海仁記路第五號

遠東時報

Vol. XIX March, 1923 No. 3

A. L. TAYLER

Main Line Electric Locomotives



ABOVE

One of the Electric Locomotives built at the Dick, Kerr Works, Preston, for the New Zealand Government. Gauge 3'6".

BELOW

The first electric locomotive for the Midi Railway of France. Standard Gauge.

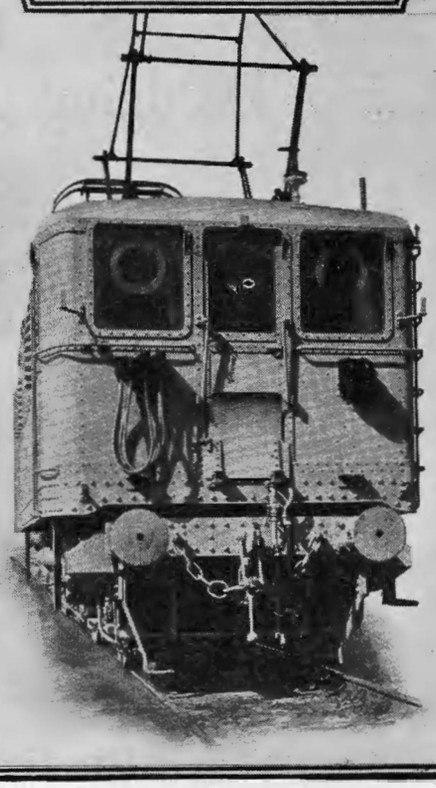
"ENGLISH ELECTRIC" LOCOMOTIVES HAVE BEEN ADOPTED ON HIGH TENSION DIRECT CURRENT SYSTEMS ALL OVER THE WORLD.

Here are Instances:—

1 The Arthur's Pass section of the Midland Railway of New Zealand, the first main line electrification in the British Dominions, is being carried out by the English Electric Company.

2 The Japanese Government Railways have placed a contract with the English Electric Company for the whole of the 34 passenger and freight locomotives required for the electrification of the first section of their main line.

3 The Midi Railway of France, the first French Railway to electrify its main line, requires 200 locomotives. These are being constructed by the Constructions Electriques de France, associates of the English Electric Company, and the electrical equipments are of "English Electric" design, manufactured either in England or France.



The ENGLISH ELECTRIC Company Limited.

WORKS:-

DICK, KERR WORKS, PRESTON. ORDNANCE WORKS, COVENTRY.
PHŒNIX WORKS, BRADFORD. SIEMENS WORKS, STAFFORD.
WILLANS WORKS, RUGBY.

HEAD OFFICE:-

Queen's House, Kingsway, London, W.C.2.

TELEPHONE ---------- HOLBORN, 830.

China Office: THE JARDINE ENGINEERING CORPORATION, LTD. *Head Office*: 8a Yuen-Ming-Yuen Road, Shanghai

Japan Office: THE ENGLISH ELECTRIC CO., LTD., Yuraku Buildings, Marunouchi, Tokyo

determined to place herself in a position to endure as a nation, with or without the consent of the rest of the world.

Gen. Harbord declared that he wished to emphasize the vital importance of having such a plan "in a state of fire-alarm readiness for execution."

"There are those who," said Gen. Harbord, "for reasons of their own, will tell you that we need no such plan; that this country was never in less danger of attack than at this present moment. Possibly so. I sincerely hope so, but I cannot forget that we have been told that same thing in every generation of this country's history, and that, in spite of such assurance, no generation has been without urgent need of such plans or has failed to suffer for lack of them.

Points to Fate of Greece

"Within the past few months we have seen what may happen to a country in consequence of not having had definite plans commensurate with the position it has assumed in world affairs. We have seen its armies in defeat and disgrace; its high officials condemned to death and executed; its government overthrown by outraged people.

"Within the last four months two important cities of the world have changed hands in obedience to more or less direct pressure from the Soviet government of Russia, displacing Great Britain in the one case and Japan in the other. These cities are Constantinople and Vladivostok—cities at the opposite ends of the great continent of Asia and nearly 3,000 miles apart.

"Please consider this change of sovereignty in connection with the fact that the Red government of Russia is maintaining to-day by far the largest army in the world. If, with all her disorganization and her status as a virtual outcast among the nations, her influence is felt so strongly at such distances, the world may well speculate as to possible combinations to which Russia may be a party, while Germany, in the bitterness of defeat and economic distress, is seeking a friend if not an ally.

Turkey's Quick Comeback

"In October, 1918, after complete defeat, Turkey signed an armistice. Her army which had lost 600,000 men by disease alone, was demobilized and scattered all over Western Asia. If there was a single nation in the war more completely humbled than the other defeated combatants, it was unquestionably the Ottoman empire. Demoralized and dismembered she seemed utterly prostrated. Within two years she has rallied from that condition by the organization of an army and is talking ultimatums on terms of equality with our late allies in the great war. This indicates the potentialities of a national army in being and a people willing to fight.

"In the limitation of armament conference in Washington in the autumn of 1921, China, with her standing for integrity among the yellow races, her 400,000,000 of people, and her tremendous expanse of territory, sat near the foot of the table below Holland, Italy and other second rate powers.

"Near the head of the table, with less than a twentieth of her territory and a mere fraction of China's population, Japan was sitting in the seats of the mighty!

"With less reputation for integrity and dependability among the other yellow or white races than China, why was Japan in the seat of honor and China in the tail of the procession? The whole world knows that Japan is willing and able to fight. A nation has to have a navy and an army to sit at the head table in any world conference.

"Now, let us consider for a moment the defense measures to which the people of this country are asked to give their support. Just what do they amount to?

An Army of Non-Professionals

"Briefly, they involve the support of a professional force barely sufficient to provide for the peace time needs of our overseas garrisons and for the preservation of internal order, together with a non-professional, civilian force of approximately three hundred and seventy-five thousand officers and men, an aggregate of about half a million, less than one man to every two hundred of our population—and three-quarters of that force composed of non-professional soldiers.

"In the matter of cost, if we are of the calibre to count cost in a matter of such consequence, it amounts to the pitiful difference between enough and too little, a matter of a few millions each year; a mere fraction of what we wasted during the world war through lack of such plans; a tithe of what we throw away on unnecessary luxuries and contribute to the bootleggers; an insignificant fraction of our national budget.

"But let me remind you that all of this is being done on a purely voluntary basis. The great majority of those who are laboring earnestly to make this scheme of defence mean something are doing so voluntarily and at the expense of time and effort that the average man devotes to golf, poker or bridge. What they are asking of the country in return is confidence and support—the kind and amount of confidence that the business man gives to his legal adviser, his architect, his engineer or his general manager; the amount of support required to provide for bare necessities.

"Gentlemen, this matter of national defense is not a political issue, as some are inclined to make it. It is not a matter that the political profiteer or the synthetic statesman should be permitted to exploit in his own selfish interests. It is not a question of whether this party or that shall be enabled to go before the country with a record for economy falsely made by bartering our security.

"It is wholly a question of whether or not this country shall be placed in a position to endure with or without the consent of the rest of the world."

* * *

Hongkong and Canton

ONE of the most significant parts of the speech of the chairman of the Hongkong & Shanghai Banking Corporation at the ordinary general meeting of its shareholders held in Hongkong on February 24, deals with the popular belief that British interests have steadily opposed the development of Canton as a deep-water port. As we have at various times referred to this Chinese view, we take this opportunity of presenting the other side, which effectively clarifies the matter and paves the way for a much better feeling between the Chinese and British, and a coming together on questions which have long irritated the Southern Chinese party.

Mr. A. C. Lang, in his very able presentation of Far Eastern trade and finances during the past year, placed the British position on record in the following words:—

"I would like to take this opportunity of speaking more particularly on a question which concerns both the policy of the consortium and the future interests of this colony. Allegations have been made in a responsible American quarter, and urged with an insistence which would seem to give them the character of a deliberate anti-British propaganda, that a treaty or agreement with the British exists whereby the Chinese may be debarred from creating railway facilities necessary for the development of a deep-water port for ocean-going vessels at or near Canton; and that, although such development would be the natural accompaniment of any scheme for the completion of railway communication from Hankow to Canton, it is the fixed policy of the British to oppose it, as being detrimental to the trade of Hongkong. I am in a position to state categorically that no such treaty or agreement exists. Article 15 of the Canton-Kowloon Railway loan agreement contains an undertaking, usual in railway agreements where the line constitutes the security for the loan, that the Chinese government will not allow another line to be built competing with that railway to its detriment; but this clearly refers to competing parallel lines, and could not possibly be held to preclude the Chinese government from constructing whatever terminal facilities they choose for the long-projected Hankow-Canton Railway. Whether river improvement and the construction of a deep-water harbor at Canton are practicable or not at an expenditure which would be justified by the advantages to be gained, is a question for experts to decide; I am told that they are not. However, this may be, I am persuaded that no development of trade facilities at Canton can, in the long run, be detrimental to this colony, and our Chinese friends may be assured that British policy in this matter is bounded by no such narrow outlook as that attributed to it."

This is frank, clear and to the point and is so far as THE FAR EASTERN REVIEW has contributed towards creating any misunderstanding of British policy by presenting the Chinese viewpoint, we are now equally glad to correct it. The misconception about British ideas arises solely from the interpretation the Chinese place on Article 15 of the Canton-Kowloon Railway agreement, which, they assert, prohibits them from constructing a spur from the present railway line to the river opposite Whampoa. The Chinese have inclined to the belief since the survey for the line was completed, that it was deliberately carried far away from the river so that no spur could be built that might enable them to divert freight and traffic to deep water below Canton. There has always been a feeling amongst the Chinese, that any attempt on their part to develop the port of Canton would meet with opposition from British financial interests. This idea, we have reason to believe originated when Dr. Sun Yat-sen drew up his plans for the improvement of Canton and devoted as much attention to this scheme as he did to his favorite railways plans. We are also convinced that much of the initial British antagonism to Dr. Sun arose from the knowledge that he intended to push forward his scheme for the betterment of Canton, and develop a deep-water port at Whampoa.

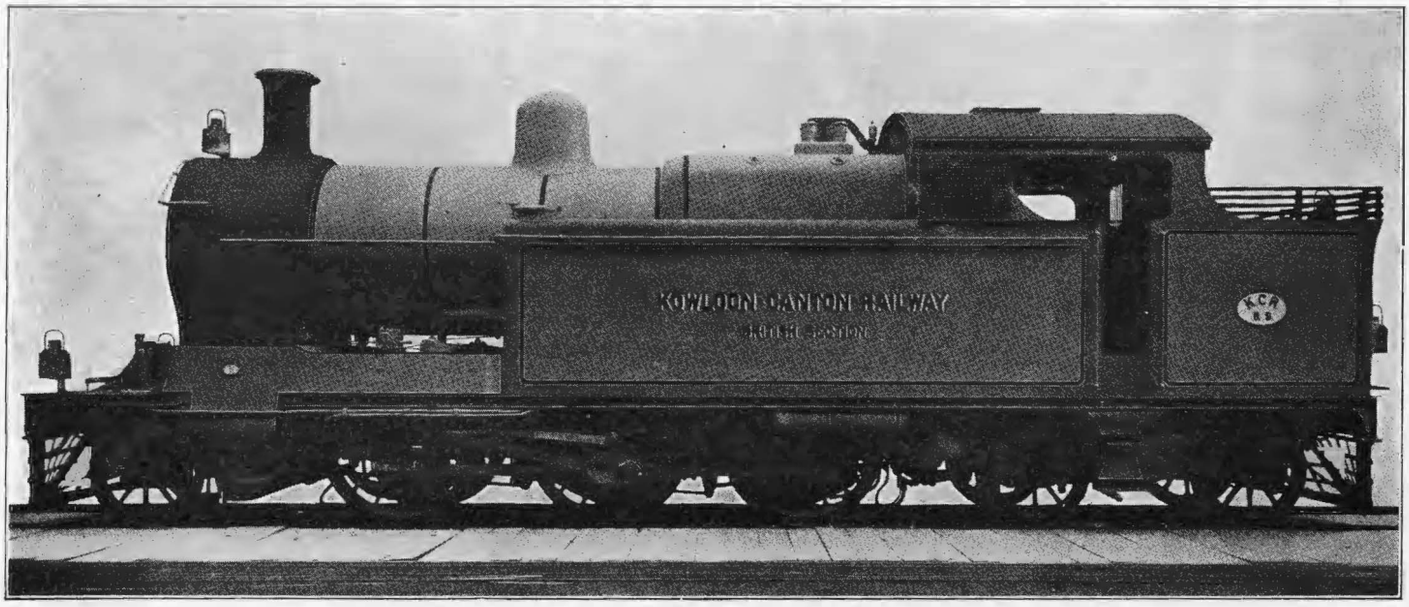
The British position now set forth so clearly by the chairman of the Hongkong & Shanghai Banking Corporation will clear away all misconceptions and disabuse the mind of Dr. Sun Yat-sen of British antagonism to his pet scheme. Once British hostility to Dr. Sun is terminated, one of the greatest obstacles to the unification of China will be eliminated. The speech of Mr. Lang will be welcomed in more than one quarter.

ASSOCIATED BRITISH LOCOMOTIVE MANUFACTURERS FOR CHINA

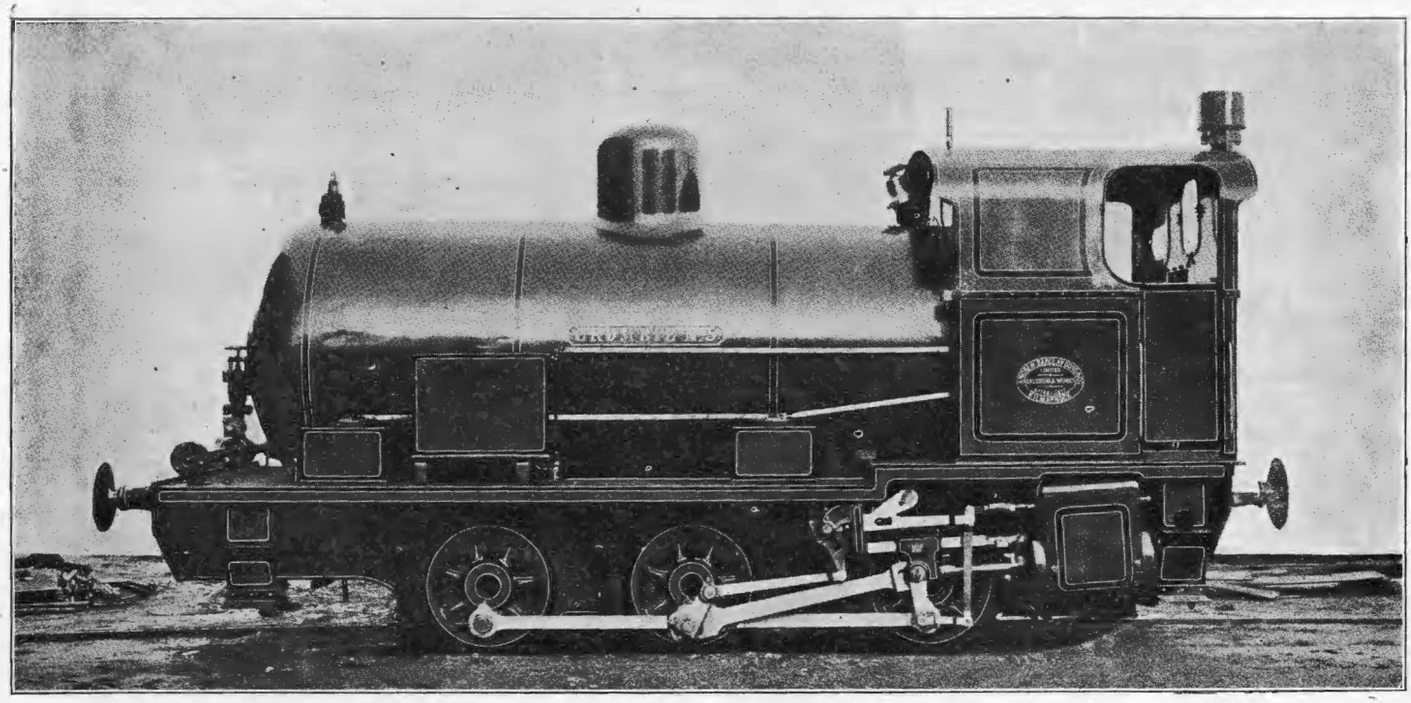
Head Office:
7 HOBART PLACE
GROSVENOR GARDENS
LONDON

TEL. ADDRESS: REBRITMAN, PEKING

Agents in China:
REPRESENTATION FOR
BRITISH MANUFACTURERS LTD.
46 WAI CHIAO PU CHIEH
PEKING



ANDREW BARCLAY SONS & CO., LTD.
THE AVONSIDE ENGINE CO., LTD.
W. G. BAGNALL LTD.
BEYER PEACOCK & CO., LTD.
HAWTHORN LESLIE & CO., LTD.
HUDSWELL CLARKE & CO., LTD.
THE HUNSLET ENGINE CO., LTD.
KITSON & CO., LTD.
NASMYTH WILSON & CO., LTD.
THE NORTH BRITISH LOCOMOTIVE CO., LTD.
ROBERT STEPHENSON & CO., LTD.
THE VULCAN FOUNDRY, LTD.
THE YORKSHIRE ENGINE CO., LTD.



AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

SUPER-POWER ZONE FOR JAPAN

American Trains De Luxe for China

Greater Tokyo

New Cement Plants

Monster Tin Dredge for Malaya

America in Manchuria

Making China Safe for Autocracy

Vol. XIX April, 1923 No. 4

SHANGHAI, PEKING, TOKYO AND MANILA

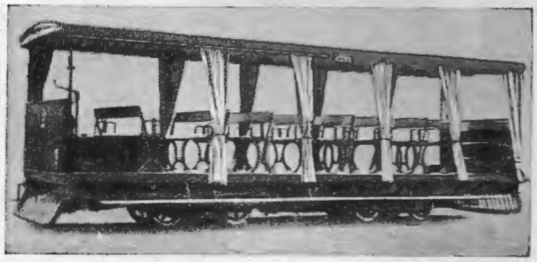
Contractors to: The Admiralty, The War Office, The India Office, The Crown Agents for the Colonies, Colonial and Foreign Governments

Internal Combustion Rail Cars, Inspection Cars, Coaches, Tramcars, Trailers, Locomotives, Tractors, etc.

British bnilt throughout and supplied to upwards of 200 Railways in all Parts of the World

Designs to meet individual requirement.

Passenger Freight Shunting | Mining Harbours Docks | Plantations Logging Contractors



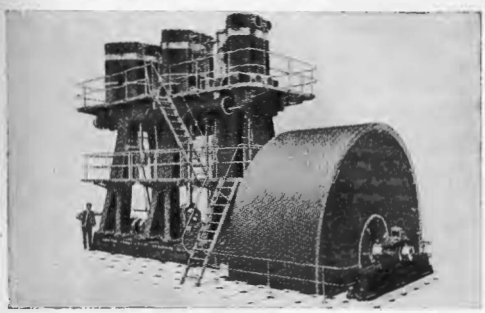
The Drewry Car Co., Ltd.

(and McEwan Pratt & Co., Ltd.)

13 South Place, London, E.C. 2
Telegrams: "Effervesce, London"
Works: Burton-on-Trent, England

ASHTON FROST & CO., LTD.

ESTABLISHED 1873.



MAKERS OF

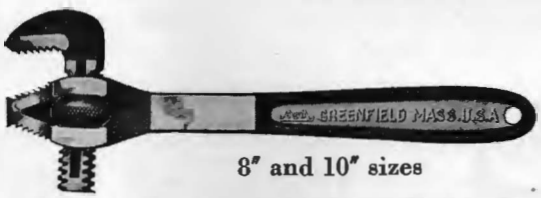
STEAM ENGINES,
MILL GEARING,
DEEP WELL PUMPS,
SEWAGE PLANT,
ETC.

TELEGRAMS: "FOUNDRY."

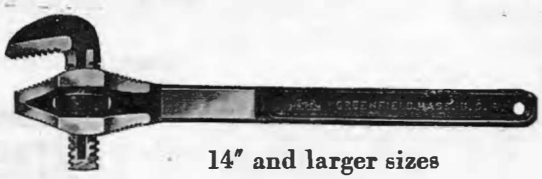
WORKS: **BLACKBURN, ENG.**

Little Giant—The New Pipe Wrench

"THE WRENCH WITH THE ORANGE HANDLE"



8" and 10" sizes



14" and larger sizes

A new design which gives increased strength, increased simplicity, increased usefulness, *less* weight, and fewer parts.
The "*Little Giant*" Pipe Wrench has become popular at once because of the end opening jaws. It can be thrust straight on a pipe like a pair of pliers, and will be found useful in places which are beyond the reach of an ordinary pipe wrench.

The arrangement of the jaw, which can be engaged at will with 2 or 4 sets of teeth on the handle can be seen in the picture. These extra sets of teeth mean long life. The "*Little Giant*" Wrench is drop-forged and heat-treated throughout.
Merchants will be particularly interested in the light weight (less than an ordinary pipe wrench) and the few parts. The "*Little Giant*" has only 3 parts, which means a smaller investment in replacements. Any of our representatives will be glad to quote prices.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

Canadian Plant: Greenfield Tap & Die Corporation of Canada, Limited, Galt, Ontario.
Cable address: "Getede"
REPRESENTATIVES

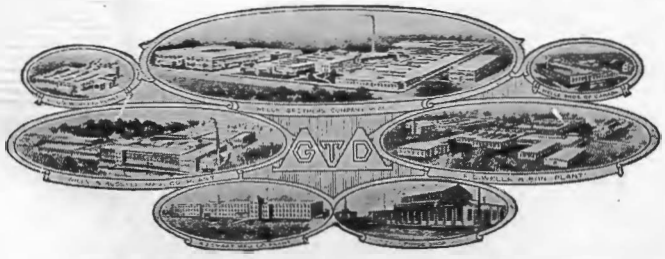
JAPAN.

MULLER, PHIPPS & SELLERS, LTD.
17 Itachibori Kitadori 5-chome, Nishi-Ku
Osaka, Japan
Fudo Bank Bldg., 9.2-chome
Honkokucho, Nihonbashiku
Tokyo, Japan

HORNE COMPANY LTD.
6-7 Takayama-cho
Kyobashi-Ku
Tokyo, Japan

CHINA.

MULLER & PHIPPS (CHINA) LTD.
5 Ice House St.
P. O. Box 25, Prince's Bldg., Hongkong, China
2 Canton Road
Shanghai, China



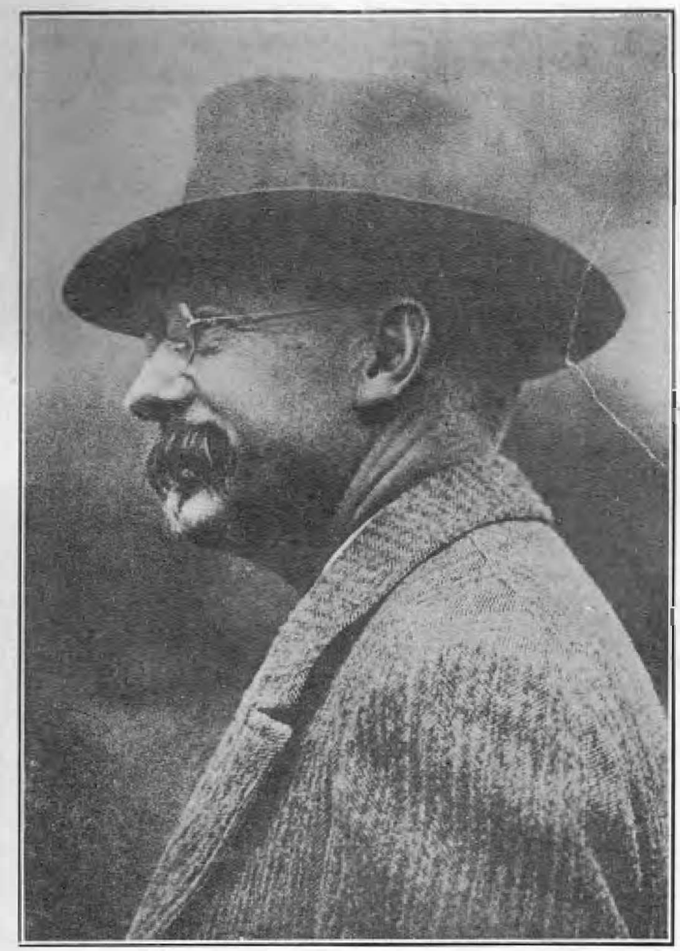
Plants of GTD *Corporation, World's Largest Manufacturers of Screw-threading Tools*

Harriman's Far Eastern Plans

The Inside History of the American Attempt to Gain Control of the South Manchuria Railway as a Link in the Harriman Round-the-World Transportation System

(Extracted from "E. H. Harriman," a Biography by George Kennan, Published by Houghton Mifflin Company, Boston and New York)

WRITTEN in memory of the great American "whose services to the science of railroading will hardly be reckoned by those who know what his work was, as less than those rendered by George Stephenson himself," the biography of E. H. Harriman by George Kennan throws a light on the inside history of American railway finance that goes far to wipe out the misconceptions which surrounded some of his operations. Harriman is shown in his proper light, one who had no time for quarrelling with others or rushing into print to defend his actions when subjected to criticism. "The people always find out what's what, in the end, and I can wait. I need all my time and energy to do things" was his characteristic answer to a friend who said he would be misjudged if he failed to defend himself. Harriman started things when he moved and in most cases carried out what he started. The most important chapter of the biography to Far Eastern readers is the one devoted to his plans to acquire control of the South Manchuria Railway. Here he certainly started something, and laid the basis of an American policy that considerably complicated the international political situation in this part of the world, Harriman's plans were undoubtedly sound from the financial and railway point of view, but he apparently gave no thought to the tremendous racial and political problems involved in American control of transportation lines traversing a disputed territory where all indications pointed to the outbreak of another great war. The chapter giving the inside history of his plans follows:



The Late E. H. Harriman

Mr. Harriman's direct business relations with the Far East began in the year 1905. The aid given by Kuhu, Loeb & Co. to the Japanese government in floating its war bonds, as well as Mr. Harriman's own interest in China and Japan, based on his connection with the Pacific Mail Steamship Company, early attracted his attention to that part of the world, and when in the spring of 1905, he received an urgent invitation to visit Japan, from the American minister in Tokyo, Mr. Lloyd C. Griscom, he determined to suspend for a time his financial and railroad activities in the United States and look over personally the Oriental field, with a view to ascertaining what could be done for the extension of American commerce in Far Eastern countries.

"It is important," he said in a letter to Mr. Griscom, "to save the commercial interests of the United States from being entirely wiped from the Pacific Ocean in the future," and "the way to find out what is best to be done is to start something." This proposal to "start something" was characteristic of Mr. Harriman's methods. He did not think it necessary to perfect all the details of a plan before going to work. When he had clearly defined the object to be attained, his policy was to "start something," and then work out the scheme in accordance with circumstances and conditions as they might arise. The clearly defined object that he had in view in this case was the extension of American influence and the promotion of American commerce in the Far East; but beyond this, with the details not yet worked out, was a plan for a round-the-world transportation line, under unified American control, by way of Japan, Manchuria, Siberia, European Russia, and the Atlantic Ocean. Such a railroad and steamship line, if successfully established, would unite for commercial purposes four of the most populous countries on the globe; and would enable the United States not only to take a commanding position in the Orient, but to supply the wants and direct in some measure the commercial activities of hundreds of millions of people in the least developed parts of Europe and Asia.

To most observers at that time a round-the-world transportation line under American management, would have seemed an unreliable dream, but Mr. Harriman had made many of his visions come true, and he believed that he could give objective reality to this one. His plan was, first, to secure control of the South Manchuria Railway, which Japan, through the fortunes of war, had just acquired from Russia. This road was then in a very unsatisfactory physical condition; but Mr. Harriman proposed to re-construct and re-equip it with American capital, and make it the eastern part of his proposed trans-Asiatic line. Having secured this essential link, he intended to buy the Chinese Eastern, which he thought the Russians, having lost Port Arthur, would gladly sell, and then acquire transportation or trackage rights over the trans-Siberian and the Russian government roads from North Manchuria to the coast of the Baltic Sea. These acquisitions, in connection with the Pacific Mail Steamship Company and the American railroad systems that he already controlled, wholly or in part, would give him a continuous line more than three-quarters of the way around the globe, and it would be a comparatively easy matter, thereafter, to connect up the termini by establishing a line of steamers across the Atlantic from the United States to Russia. He anticipated most difficulty in persuading the Japanese to surrender or share the control of the South Manchuria road, which, with the Fushun coal-fields adjacent thereto and the southern part of the island of Saghalin, were all that they had been able to get from

Russia, by way of indemnity to cover their colossal war expenditures. However, he had strong hope of success, for the reason that the Japanese were heavily in debt and urgently in need of capital for the improvement of their transportation facilities and the development of their recently acquired territory on the Asiatic mainland. The purchase of the Chinese Eastern and the acquirement of the necessary rights over the trans-Siberian he regarded as comparatively easy. Russia had allowed a Baltimore capitalist to build and manage her first railroad, from St. Petersburg to Moscow, and had even asked an American engineer to finance and construct the great road from the Urals to the Pacific. It seemed probable, therefore, that the Czar would gladly make concessions to American capitalists if, with their aid, he could have the trans-Siberian line double-tracked, properly equipped, and efficiently managed.*

Preparations for the trip to the Orient were begun. The party sailed from San Francisco on the steamship *Siberia* August 16 and, after short stops at Honolulu and Midway Island, arrived in Yokohama on the evening of August 31.

The reception given to Mr. Harriman by Japanese officials, financiers, and business men was extremely cordial. Representatives of the Bank of Japan and the famous Mitsui Company boarded the steamer as soon as the anchor was down, and when the party had landed and taken quarters at the Grand Hotel, calls and assurances of welcome were received from the president and vice-president of the Industrial Bank of Japan; the manager of the Japan Steamship Company; Count K. Inouye, one of the "Elder Statesmen;" Baron Iwasaki, Senator Watenabe, and Mr. K. Mori, a personal representative of the minister of finance.

As Mr. Harriman could spend only a limited time in the Far East, and as he desired, before his return, to visit China and Korea, he was obliged to promote his round-the-world-line enterprise, as far as it could be promoted in Tokyo, by a "whirlwind campaign" of visits and interviews. Between September 1 and 13, he made the acquaintance of all the prominent statesmen in Japan, including Marquis Ito, Count Okuma, the premier, and most of the ministers; and succeeded in awakening the interest and enlisting the support of several eminent financiers, including especially Mr. J. Soyeda, president of the Japanese Industrial Bank. Having accomplished this in a few days, he and his party started on September 13 for Kyoto and Kobe, leaving further negotiations for the acquirement of the South Manchuria Railway in the capable hands of Minister Griscom and President Soyeda.

During Mr. Harriman's absence, Minister Griscom did all that could be done to promote what seemed to him the best interests of the United States in the Orient by persuading the higher Japanese authorities to consider favorably Mr. Harriman's plans. In his interviews with Premier Katsura, Count Inouye, and the minister of finance, he took the ground that co-operation with America would be in every way profitable to Japan, by strengthening her credit, furnishing her with capital for the improvement of her transportation system, facilitating her trade, and enabling her to develop quickly and fully the material resources of her recently acquired territory on the Asiatic mainland. The South Manchuria Railway was urgently in need of reconstruction and re-equipment, and there was no man in America, perhaps in the world, better qualified by experience and ability to direct such work than the rebuilder of the Union Pacific. Mr. Harriman's relations, moreover, with American bankers and financiers were such that he could secure at once the pecuniary support which Japan needed, but which she alone might not be able to get quickly enough to meet the emergencies of the situation. The suggested project would bring Japan and the United States into much closer relations, both commercially and politically, and if successful it would furnish a large revenue to the Japanese government and thus compensate the Japanese people for their failure to get a pecuniary indemnity from Russia.

In his negotiations with the higher authorities, Mr. Griscom was ably assisted by Mr. Durham W. Stevens,† who had been in the service of the Japanese government for more than twenty years, and who had earned the respect and trust of all the emperor's statesmen and officials.

The result of their joint efforts was in every way encouraging. Premier Katsura said that he would give the matter immediate and serious consideration, and Count Inouye, one of the most influential of the elder statesmen, promised that he would call a meeting of the minister of finance, the minister of communications, and other high officials directly interested, and would try to reach a decision at once. Count Inouye himself was very favorably impressed and said to Mr. Griscom: "We would be very foolish to let such a great chance slip."

When Mr. Harriman returned to Tokyo, on October 8, negotiations were so far advanced that the imperial authorities were ready to consider promptly, if not to accept, a definite proposition; and in three or four days of strenuous activity he succeeded in getting the details settled and reduced to writing in the following memorandum of agreement:—

Memorandum of a preliminary understanding, dated October 12, 1905, between His Excellency Count Katsura Taro, representing the Japanese government, and Mr. E. H. Harriman, representing himself and associates.

"A syndicate to be formed to provide capital for the purchase of the South Manchuria Railway, acquired by the Japanese government, and its appurtenances; the rehabilitation, equipment, reconstruction and extension of the same, and the completion and improvement of the terminals at Tairen (Dalny); and it is understood that the two parties are to have joint and equal ownership in the properties acquired. Permission to work coal mines (in connection with the railroad) to be given to a corporation by special agreement, in which there shall be joint interest and representation.

The principle of development of all industrial enterprises in Manchuria shall be such that each party shall have the right to an equal interest with the other. The Manchurian railroad, with its appurtenances rails, cross-ties, bridges, superstructure of all character, stations, buildings, platforms, warehouses, docks, wharves, etc., to be taken at their true value, to be determined by joint representation of each party.

The organization to be made on basis that will meet exigencies and conditions as they may exist at the time. As it is deemed advisable to meet the conditions in Japan, the corporation is to be operated with Japanese control. Changes are, however, to be made therein from time to time, as far as circumstances will permit, looking toward a final equalization of representation and control. The corporation is to be organized under Japanese law. Mr. Harriman, having agreed for himself to operation through a Japanese company, the only open question is as to his associates agreeing thereto, which he believes they will.

To provide for an arbitrator, it is agreed that Mr. Henry W. Dension shall be appointed to fill that place.

---

* The proposal to finance and build the trans-Siberian railway was made by the Russian government to a well-known railroad engineer in the United States. The terms offered were liberal, but the amount of capitalr equired was so great that it could not be obtained without the aid, or at least the goodwill, of the Jewish bankers and financiers in Europe. They, incensed by the treatment of their people in Russia, declined to co-operate, and the American engineer found it impossible to organize a syndicate that would be strong enough to finance the enterprise in July and were soon completed.

† Mr. Stevens entered the Service of the Japanese government in 1883, as counsellor of its legation in Washington. He was soon afterwards transferred to Tokyo, where he became a member of the bureau du protocol of the conference for the revision of treaties between Japan and foreign powers. Between 1887 and 1904 he was engaged in various diplomatic negotiations, and in the latter year he was appointed adviser to the Korean government at Seoul. He was assassinated in San Francisco in 1908 by a misguided Korean fanatic who regarded him as an enemy of the Korean people, although, in reality, he had always been their sincere friend.

In case of war between Japan and China, or Japan and Russia, the railroad shall at all times obey the instructions of the Japanese government in the matter of the conveyance of troops and war materials, and the Japanese government is to compensate the railroad for services rendered and protect it against aggressions at all times.

It is agreed that Mr. J. Soyeda, president of the Industrial Bank of Japan, shall be the medium of communication between the parties hereto.

The including of any outside interests (other) than the parties hereto shall be done only after conference and mutual agreement."

With this memorandum of agreement in his possession, Mr. Harriman sailed from Yokohama in the steamship *Siberia* on the afternoon of Friday, October 12. He had not accomplished all that he desired to accomplish, but he had at least "started something," and there seemed to be a fair prospect that the concession thus obtained would ultimately lead to the consolidation of Japanese and American transportation interests on the Asiatic mainland, and greatly extend and promote the commerce of the United States in that part of the Orient.

Unfortunately, while Mr. Harriman was at sea, on his way to San Francisco, all his Far Eastern plans were suddenly blocked by an obstacle that he had neither foreseen nor considered. Three days after he sailed from Yokohama, Baron Komura, the Japanese minister of foreign affairs, returned to Tokyo from the United States, bringing the treaty that he and Minister Takahira had just negotiated with the Russian plenipotentiaries at Portsmouth. As soon as the Harriman-Katsura agreement for joint control of the South Manchuria Railway was shown him, he said "It cannot possibly be carried out, because it is inconsistent with Article VI of the treaty that we have just made with Russia." The article in question provided that the transfer of the South Manchurian road from Russia to Japan should be made only with the consent of the Chinese government. Until, therefore, such consent should be obtained, Japan had no legal rights that could be shared with Mr. Harriman. Aside from this, Baron Komura was opposed to the Harriman-Katsura agreement on its merits. The Japanese people were already so dissatisfied with the Portsmouth Treaty that they had resorted to mob violence as a protest against it, and their discontent would be greatly increased if they should learn that their government had sold to a Japanese-American syndicate nearly all that they had gained in two years of successful war. To have made peace without securing a pecuniary indemnity was bad enough; but to sell more than half the fruits of their victory to the Americans, and thus throw open to foreign competition the commercial field which they had bought with their treasure and blood would seem to them intolerable.

Baron Komura's arguments and influence were too strong for the supporters of the Japanese-American agreement, and in less than a week a change of policy was decided upon. When Mr. Harriman, with his mind full of plans for the future, arrived in San Francisco, he received from the Japanese consul there the following note:—

I beg to inform you that I have been instructed by Count Katsura, of my government, to deliver the following message to you immediately upon your arrival in San Francisco:—

"The Japanese government have found it necessary to institute a more thorough investigation and examination of the questions which are the subject of memorandum of October 12, 1905, and they consequently request you to regard the memorandum as in abeyance until they are able to communicate with you more fully regarding the matter."

Ten days later, when Mr. Harriman had reached New York, he received the following cable message from Mr. J. Soyeda, president of the Industrial Bank of Japan:—

Tokyo, October 30, 1905.

E. H. HARRIMAN, New York.

Prime minister requests to forward following confidential message to you explanatory message handed you by Japanese consul San Francisco.

"Having considered detailed report made by minister of foreign affairs on his return home, and having in view pacific attitude Chinese government on railroad question, Japanese government has come to conclusion that question embodied in memorandum, October 12, requires more thorough and complete examination than possible at present time. As you are aware, Portsmouth Treaty provides for consent of China regarding transfer to Japan of railroad property, and for agreement with Russia regulating connecting railroad service. Until agreements with China and Russia are concluded, impossible to determine precisely what rights and properties are included in the transfer, or what earning capacity of railroad is likely to be. Without full knowledge on these points impossible to make definite arrangements for working railroad and property which would prove satisfactory to either Japanese government or E. H. Harriman. Consequently Japanese government deem wise request E. H. Harriman to regard said memorandum as in abeyance for the time being. Japanese government will proceed, as soon as possible, to conclude necessary international agreement. Such agreement will probably necessitate some essential change in proposed arrangement with Mr. Harriman. But in any event, Japanese government will consult him before making arrangement with private capital."

SOYEDA.

This cable message was the result of a compromise between Baron Komura and the supporters of the Harriman-Katsura memorandum. The former advocated immediate cancellation of the agreement, for the reason that it was inconsistent with Article VI of the Portsmouth Treaty. In view, however, of all the circumstances, and especially of Katsura's ignorance of the stipulation regarding Chinese consent, Baron Komura agreed to regard the memorandum as "in abeyance," and to leave open the possibility of confirmation at a later time, provided no objection should be raised by the government of China.

If the Japanese minister of foreign affairs had been previously consulted, and had favored the agreement on its merits, he might possibly have found some means of dealing with the Chinese complication; but he had never met Mr. Harriman and had not been impressed, as had his colleagues, by the latter's forceful personality; he doubted the expediency of sharing control of the South Manchurian road with a syndicate about which he knew little or nothing; and he believed that the agreement, if allowed to go into effect at that time, would increase his own unpopularity in Japan, and would render extremely difficult, if not wholly impossible, the negotiation of the treaty with China that he then had in contemplation. He, therefore, insisted upon postponement, at least, and the other members of the ministry yielded.

In this thwarting of Mr. Harriman's plans there seems to have been no intentional breach of faith on the part of the Tokyo authorities. It was simply a case in which one branch of the government, acting independently, concluded a treaty that nullified action taken almost simultaneously by another branch. Count Katsura did not know that Baron Komura had agreed in Portsmouth to make the transfer of the railroad conditional upon Chinese consent, while Komura, in concluding such agreement with Russia, was ignorant of the Tokyo memorandum. One compact or the other had to be set aside, and in holding the Harriman agreement "in abeyance" while he negotiated with China, Baron Komura thought, perhaps, that he was making the best of an accidental and unfortunate situation. But be that as it may, he started for Peking with Mr. Denison, on November 6, leaving the railroad matter in this unsettled state.

Negotiations with the government of China for a new treaty occupied more than a month, and Mr. Harriman was not informed

of the result until January 15, 1906, when he received from Mr. Soyeda the following cable message :—

Tokyo, January 15, 1906.

E. H. HARRIMAN, New York.

Baron Komura returned on January 1 and the new cabinet was formed on the 7th. I have been urging the necessity of informing you what to be done, and am now asked to wire you. Count Katsura requests me to let you know that obtaining from China consent contemplated by Article VI Portsmouth, N.H., Treaty it was necessary to provide that Manchurian railway should be worked by company composed exclusively of Japanese and Chinese shareholders, following in that respect terms of original concession to Russia. Count desires me to convey expression of regret that, in view of above circumstance, he is compelled to ask you regarding memorandum of October 12, 1905, as of no effect, as it is manifestly impossible to make any arrangement based on it. He adds, however, that the Japanese government entertain a doubt as to possibility of Japanese and Chinese capital alone being sufficient to meet requirements of necessary improvements and extension of Manchurian Railway, and that therefore should an occasion arise in future enabling them to open negotiations with foreign capitalists, on a different basis, a fresh consultation may be held with you. I desire to add Count has been relieved of his position as prime minister, and send this telegram after consulting with Marquis Saionji, his successor.

SOYEDA.

In a letter written to Minister Griscom in January, 1906, Mr. H. W. Denison, legal adviser of the Japanese foreign office, gave the following explanation of Baron Komura's failure to get the consent of China to the Harriman-Katsura agreement :—

"The Japanese government have secured the consent of China to the assignment of the railroad (the South Manchurian) between Port Arthur and Chang-chun, subject to the same terms and conditions that attached to the original grant to Russia ; that is to say, the railroad is to be worked by a company composed exclusively of Japanese and Chinese shareholders. You will find the original concession to Russia in Rockhill's book "Treaties and Conventions with and Concerning China and Korea," pp. 207-224, and I enclose a newspaper copy of the official version of Baron Komura's agreements with China . . . If the Chinese avail themselves of the opportunity of taking half a share in the Manchurian enterprises, a definite understanding on the basis of the memorandum of October 12 is impracticable. There is at the present time a very strong anti-concession wave sweeping over China. The government are endeavoring, by hook or by crook, to get back the grants already made. They cancel the concessions in case of default in any direction, and they buy back the grants if no grounds for cancellation exist. In this frame of mind, and being unable to cancel or repurchase the Manchurian concessions, it is more than likely that China will gladly take the one-half interest in the enterprise. In that case I believe some arrangement on new lines will be possible, but only if the negotiations are undertaken by a man of force and prestige like Mr. Harriman."

In the spring of 1906, Mr. Jacob H. Schiff, of the firm of Kuhu, Loeb & Co., happened to visit the Far East, and, at the request of his old friend and associate, Mr. Harriman, made an attempt to revive the 1905 agreement ; but Baron Komura was as much opposed to it as ever, and after a number of conferences the negotiations were again dropped.

Thus ended Mr. Harriman's attempt to get control, or partial control, of the South Manchuria Railway, as an essential link in his projected round-the-world transportation line. His ill success, however, did not shake his faith in the practicability of the enterprise, but merely led him to consider other means of bridging the gap between the Gulf of Pechili and the trans-Siberian road. The difficulties in the way were very great. A new and independent line through Manchuria or Mongolia could not be built without Chinese consent, and the Chinese, at that time, were strongly opposed to the granting of any more railroad concessions to foreign syndicates. So far, moreover, as a line through Manchuria was concerned, they themselves were almost powerless, for the reason that, in the treaty of December, 1906, with Japan, they had agreed "not to construct any main line in the neighborhood of and parallel to the South Manchuria Railway." Even, therefore, if they had been willing to let Mr. Harriman build a road from the Gulf of Pechili to the terminus of the Chinese Eastern, they could not do so, because it would necessarily be a "main line in the neighborhood of and parallel to the South Manchurian."

Mr. Harriman thought, at one time, of building a road across the Gobi Desert by the old caravan route, passing through Kalgan and Urga and connecting with the trans-Siberian near Irkutsk ; but as the distance would be great—twelve hundred miles or more—and as most of the country to be traversed was so barren as to promise little in the way of agricultural development, this scheme was soon dismissed as impracticable.* The only alternative was a new line, about four hundred and fifty miles in length, from the Gulf of Pechili to the trans-Siberian Railway at Tsitsihar. This road, although nearly parallel with the South Manchurian, would be separated from it by an average distance of one hundred and seventy miles, and consequently would not be in the prohibited "neighborhood."

In the early part of 1906, Mr. Harriman received full reports on the trade, industry, and resources of northeastern China from Colonel Holabird and Mr. Wallace, two experts whom he had sent to make investigations in the Far East ; and in that and the following year he was kept fully informed with regard to railroad affairs in Siberia and Manchuria by Willard D. Straight, consul-general of the United States at Mukden.†

For a year or more, no opportunity to promote the Far Eastern enterprise presented itself; but in September, 1907, Lord French, representing Pauling & Co., of London, and Mr. J. O. P. Bland, representing the "British and Chinese Corporation," secured from the Chinese government the right to extend the Chinese Imperial Railway from Hsin-min-tun to Fakumen, with the privilege of building, ultimately, to the trans-Siberian at Tsitsihar. As this seemed to open the way for such a Russian connection as Mr. Harriman had in view, Mr. Straight wrote him, in September, 1907, suggesting an alliance with the British syndicate, as a means of securing the essential link in the projected round-the-world line without the co-operation of the Japanese. Mr. Harriman replied by cable, however, in October, 1907, that, owing to the panic of that year, financial conditions were such as to prevent the raising of the necessary funds.

In the summer of 1908, when the financial situation in the United States had somewhat improved, Mr. Harriman decided to make another move in the Far East, and requested Secretary Root to recall Consul-General Straight, in order that American capitalists might discuss with him the expediency of making a loan to China for agricultural development and railroad construction in Manchuria.

---

*It is not certain, however, that even this line would have been unprofitable. The Chinese themselves afterward began the construction of four hundred miles of railway along this route, and on the Peking-Kalgan section, which was completed in 1912, the net profits of operation in 1913 were twenty per cent. on the investment.

†Mr. Straight was a young graduate of Cornell University whose acquaintance Mr. Harriman made in October, 1905, at the house of Edward Vernon Morgan, American minister to Korea. Mr. Straight was then vice-consul-general in Seoul, but he had previously been correspondent of Reuter's Agency and the Associated Press in Korea and Manchuria and had spent two years in the service of the Chinese imperial maritime customs at Nanking and Peking. He impressed Mr. Harriman as a young man of character and force, and one whose ability and experience might make him a valuable assistant in such an enterprise as that which was then in contemplation. When the American legation in Seoul was closed, in the fall of 1905, Mr. Straight went with Minister Morgan as private secretary, and when Mr. Morgan was appointed minister to Cuba in 1906, he accompanied him to Havana. A few months later the state department transferred him to China and made him consul-general at Mukden. On his way back to the Far East, in the summer of 1906, he spent a week-end at Arden, where Mr. Harriman discussed with him the railroad situation in Manchuria and arranged to keed in touch with him by means of correspondence.

Meanwhile Mr Straight had secured from Tang Shao-yi, the Chinese governor at Mukden, a signed memorandum of agreement which was to form the basis of negotiations for a loan of $20,000,000. With this sum it was proposed to establish a Manchurian Bank, which should co-operate with American and Chinese interests in the construction of a railway from Tsitsihar to Aigun. Then, if the bank and the American capitalists could come to an agreement with Pauling & Co., who had the right to build a road southward from Tsitsihar to Hsin-min-tun, it would be possible to construct a trunk-line from the Gulf of Pechili to the Amur, and thus bridge the gap between the Pacific Ocean and the trans-Siberian road.

In September, 1908, Consul-General Straight returned to the United States, bringing with him the memorandum of agreement with Tang Shao-yi for the $20,000,000 loan. Through the influence of Mr. Harriman, and with the cognizance and approval of the secretary of state, Kuhu, Loeb & Co., agreed to undertake this loan, provided all the details thereof could be satisfactorily arranged. Late in November, Tang Shao-yi came to Washington, ostensibly to thank President Roosevelt for the remission of part of the Boxer indemnity, but really, in great part, to negotiate the proposed loan for the establishment of the Manchurian Bank.

Here again, however, Mr. Harriman's plans were blocked by events that could not possibly have been foreseen. Tang Shao-yi's appointment had been made through the influence of his friend Yuan Shih-kai, who was then grand councillor and head of the Chinese foreign office, and who was greatly interested in securing American capital for the development of Manchurian resources. About the middle of November, 1908, both the emperor and the empress-dowager of China died, and Prince Chun, an enemy of Yuan Shih-kai, became regent. This undermined Yuan's power, and led, a few weeks later, to his dismissal from office. Tang Shao-yi, thus left without support at home, became discouraged, and the matter of the loan was allowed to drop.

Mr. Harriman, however, continued his negotiations for the acquirement of a Manchurian line, both with Russia and again with Japan. In the summer of 1909, after he was stricken with mortal illness, he secured a promise from the Russian minister of foreign affairs, Mr. Kokovtsef, that upon the latter's return from a trip that he was about to make to the Far East, he would recommend the sale of the Chinese Eastern Railway to American interests. But even this partial success came too late. On September 9, Mr. Harriman died, and there was no one left in America capable of undertaking, much less of carrying through, such a colossal enterprise as the establishment of a round-the-world American transportation line. Whether the " Master Builder " himself could have accomplished it, if he had lived, it is impossible to say; but the results of successful accomplishment might have influenced profoundly the world's history. No one who has studied Mr. Harriman's constructive and administrative methods can doubt that if he had ever acquired even partial control of the trans-Siberian railway, he would have doubled or trebled its carrying capacity. Then when the great war of 1914 came, Russia would have been able to draw heavy artillery and ammunition from Japan and America over an efficient through line of great capacity, and would not have been reduced to such straits as she was when her troops, largely without proper weapons and almost wholly without reserves of ammunition were forced out of Poland and driven halfway to Petrograd. Her defeats in the war with Japan in 1904-05 were mainly due to the inadequacy of the trans-Siberian road as a means of speedy transportation, and her reverses on the German frontier, ten years later, were due, in part at least, to the same cause. During the winter and spring of every year, the railroad to the Pacific was her only open line of communication with the outside world, and it never was in physical condition to meet the demands made upon it. If, reconstructed and re-equipped by Mr. Harriman and the American syndicate, it had been made part of a great international transportation system, it might have become the decisive factor in the struggle with Germany in 1914-15, and might thus have changed the earlier stages, if not the whole course, of the great world war.

The Kwantung Lease

Throw On The Limelight

IT is not often we agree with the conclusions of " Putnam Weale " on Chinese political questions. However, we confess that the most enlightening contribution from the Chinese official side to the controversy with Japan over the legality of the Kwantung lease, comes from his pen in an article entitled " The Story of the Twenty One Demands." Mr. Simpson bears out our contention that the truth about the demands remains to be told. We have invited attention to the conflicting stories emanating from Tokyo and Peking which disclose that the ultimatum was invited by Yuan Shih-kai to save his face before the nation; that there was some sort of secret understanding between Yuan and Okuma in which the former contributed funds to the latter's political campaign in Japan in exchange for a promise to support his restoration of the monarchy.

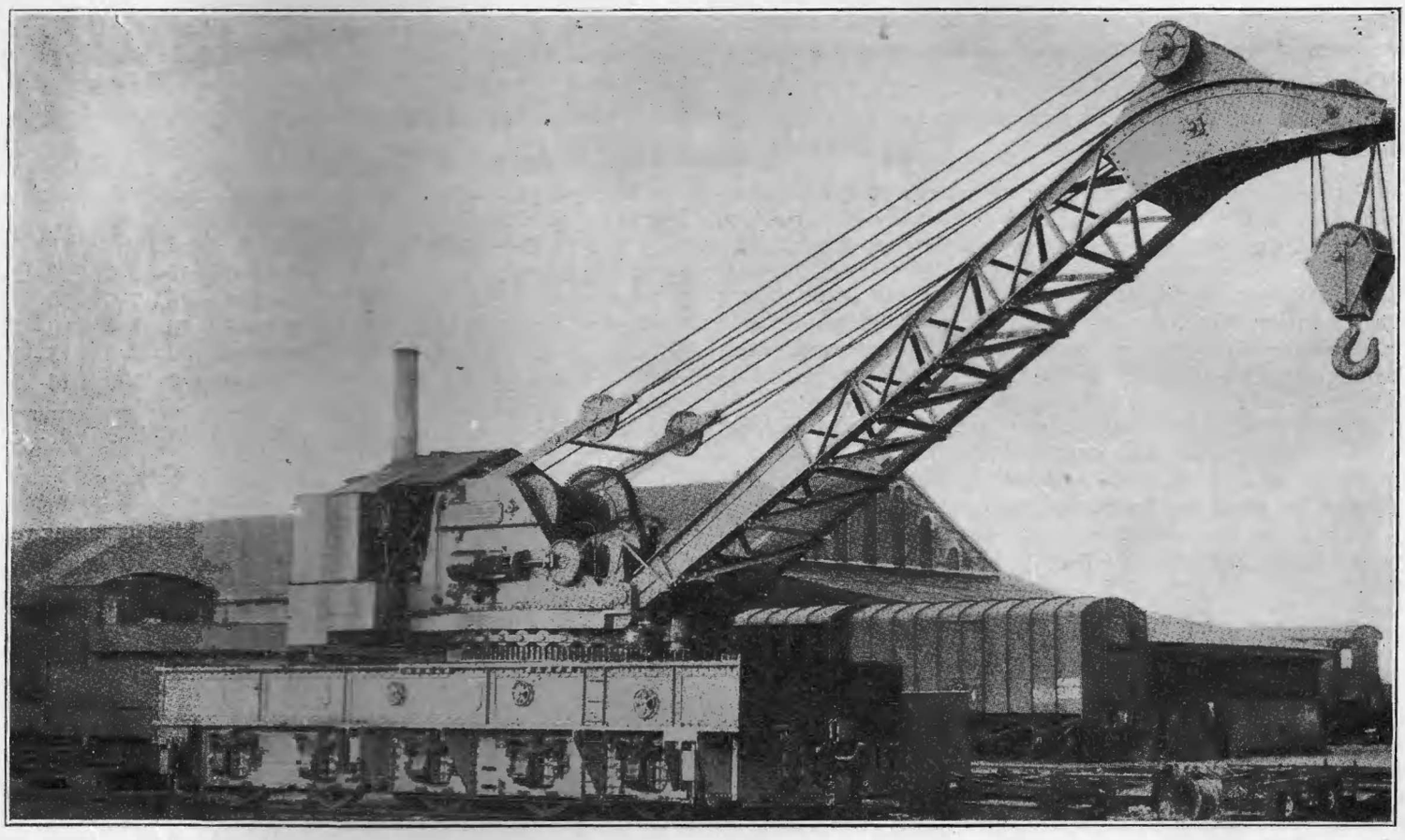
We have since learned from the highest authorities in Tokyo that it was Tsao Ju-lin, the vice-minister of foreign affairs in the Yuan government, who personally visited the Japanese legation and requested Minister Hioki on behalf of Yuan to present the ultimatum. We have also learned on equally good authority of the existence of a signed statement of Marquis Okuma which corroborates the above story and throws further light on the negotiations of 1915. This was in the form of an interview for the American press, a copy of which was submitted to a foreign newspaper in Japan and rejected. The signed statement, however, is still in existence in the original Japanese bearing Okuma's well-known signature.

In presenting his version of the demands, Mr. Simpson says:

" The Japanese had quite accurate information regarding the monarchy plan almost before Yuan Shih-kai himself was thoroughly aware that his inner circle had determined to make him emperor or wreck the country in the attempt. His opposition to Japan was expressed in such a form that it was easy to take advantage of a moral vulnerability which could only arise through treachery. Treachery to the republic had been settled upon in Peking; that is why in the preamble to the Twenty-One Demands (which has never been published in its complete form and probably never will be) the Japanese told him plainly that as he was virtually emperor it rested with him either to enlist the decisive factor—Japan—on his side or take the consequences.

" Had he been really a bold man and politically honest, he would have taken the consequences, and circulated as fast at printing presses could print millions of copies of the Twenty-One Demands until the heavens and earth were filled with them. That was his one last chance. He missed it. The secrecy enjoined upon him which he officially preserved was the silken cord which finally strangled him. Imagine any man allowing himself to be murdered in a room, with the windows open and 400 million people outside unless he is in some way an accessory!

" Thus the position at the very start was not what the Chinese people have been taught to believe. The treachery (if it is necessary to employ such strong word) was not on the side of Japan. The Japanese having been rudely challenged, as they considered, after having more or less unwillingly captured Tsingtao were determined to see who was master in the region of the Far East. And they proceeded to work on lines which were not exceptional since they had done the same thing in Korea . . . That in addition to the formal negotiations, Yuan Shih-kai was carrying on private soundings in Tokyo need not be doubted."



36-Ton Breakdown Crane for the S.N.R.

Built by Messrs. Joseph Booth & Bros. Ltd.

DESCRIPTION of 36-ton steam breakdown crane built for the Shanghai-Nanking Railway by Messrs. Joseph, Booth & Bros., Ltd., Union Foundry, Rodley, Leeds, to the designs and specifications of the railway consulting engineers, Messrs. Sir John Wolfe Barry and partners of Westminster, London.

The crane is capable of running on a train up to 45 miles per hour.

The normal capacity of the crane is

36 tons at 20-ft. radius.
26 ,, ,, 24 ,, ,,
20 ,, ,, 29 ,, ,,
15 ,, ,, 32 ,, ,,

With the draw girders out and the screw jacks blocked when the draw girders are out to the maximum distance the screw jacks are 15-ft. from centre to centre.

There are also four rail clips to secure to the rails in case of necessity.

The hoisting rope is 4-in. circumference and 230-ft. long and the derricking rope 3.75-in. circumference and 280-ft. long. The hoisting rope is wound on a cast iron barrel with 25 right-hand grooves, being driven through machine cut cast steel gearing from the engine shaft and arranged for hoisting, slewing, derricking and traveling. The hoisting machinery is mounted on a strong plate frame carried with the jib on a cast steel bottom swivel 9-in. 9-in. diameter.

The bottom swivel is driven by a cast steel pinion coupled through bevel gearing and friction clutches on the main engine shaft and meshing into a circular rack on the periphery of the roller path immediately beneath, the swivel revolving on 36 mild steel rollers 8-in. diameter.

The boiler is mounted on an extension platform carried on two 15-in. by 4-in. channels securely bolted to the engine frame coal bankers and tank being carried on the same platform.

The engine has two 9½ by 12-in. stroke cylinders one mounted on each side of the main frame and directly coupled to the engine main shaft. The boiler is a 4-ft. 6-in. diameter by 6-ft. 3-in. high Spencer Hopwood quick steaming boiler 100-lbs. working pressure with both injector and duplex pump feed and all necessary fittings.

The driver's platform is immediately in front of the boiler and protected by a roof, the operating levers are directly in front of the driver and consist of steam, derrick and travel, slewing, hoisting, and reversing levers and also a foot brake.

A chequer plate platform on either side permits the driver or fireman to attend to any part of the machinery whilst crane is working.

The machinery is all mounted on a steel plate underframe carrying on the underside the propping joists and the whole carried on five pairs of wheels 43-in. diameter the journals being 6-in. by 12-in. all running in cast steel boxes.

The two leading pairs of wheels with a 5-ft. 9-in. wheels base run in a heavy plate frame bogie, the axle boxes of the remaining three pairs being mounted in the main frame with a rigid wheel base.

Heavy elliptical springs transmit the load from the frame to the axle boxes, a steel distance block placing the load directly on the spring buckle when the crane is working.

Both the crane and the match truck are equipped with Westinghouse air brakes as well as hand brakes. Janney Penn couplers with centralizing buffers permit of easy coupling on curves.

The match truck consists of a 15-ft. 4-in. channel under-frame mounted on two bogies with 2-ft. 9-in. wheels in diameter such bogies carrying a jib support on which the jib is lowered when traveling and a tool box.

With the crane standing on curve of about 312-ft. radius drawbars extended and jacked with screws at 15-ft. centres, rail clips not in use, pads all in place over spring buckles. Under this condition, the crane was tested with the result thus :

Load.	*Radius of Jib.*	*Test.*	*Speed.*
45 tons	20′–0″	Slewing clockwise and counter clockwise	Full
,,	,,	Hoisting	14-ft. in 53 sec.
(B.P. 80-lbs. per sq. in. Stop valve 75-lbs. per sq. in.)			
36 tons	20′–0″	Slewing clockwise	2 rev. in 68 sec.
,,	,,	,, counter clockwise	,, ,, 57 ,,
(B.P. 85-65-lbs. per sq. in. Stop valve 50-lbs. per sq. in.)			
36 tons	20′–0″	Hoisting	14-ft. in 49 sec.
(B.P 90-80-lbs. per sq. in. Stop valve 75-lbs. per sq. in.)			
26 tons	24′–0″	Slewing clockwise and counter clockwise	1 rev. in 29 sec.
(B.P. 40-lbs. per sq. in. Stop valve 40-lbs. per sq. in.)			
26 tons	24′–0″	Hoisting	14-ft. in 41 sec.
(B.P. 80-lbs. per sq. in. Stop valve 70-lbs. per sq. in.)			
20 tons	29′–0″	Slewing clockwise	1 rev. in 33 sec.
,,	,,	,, counterclockwise	,, ,, 31 ,,
,,	,,	Hoisting (slow gear)	14-ft. in 38 sec.
,,	,,	,, (fast ,,)	14-ft. in 22.5 sec.
(B.P. 75-lbs. per sq. in. Stop valve 55-lbs. per sq. in.)			
15 tons	32′–0″	Hoisting	12′–6″ in 18.5 sec.

Under all hoisting tests the crane jib was at right angles to the axis of the track.

To test the derricking speed, from max. radius—32-ft. to min. radius—20-ft. timing 46 sec. with no load on the crane.

Crane tested free on rails, screw jacks released free of packings, with a load of 7 tons, 0 cwt. and 2 grs. lifted at 20-ft. radius and gradually derricked out to 35 feet without tipping the crane.

The indicator plate showing the radius of the jib is marked with safe loads as follows :

35 tons at 20′–0″	Propped,	10 tons	unpropped.
26 ,, ,, 24′–0″	,,	7 ,,	,,
20 ,, ,, 29′–0″	,,	4 ,,	,,
15 ,, ,, 32′–0″	,,	3	,,

The crane traveled freely on a curve about 312-ft. radius at 22-ft. 6-in. in 12 sec.

The bogie centre traversed 2-in. of the 3½-in. side play provided, the full weight is taken on the centre, the side bearers being quite clear.

The bogie control springs are put into place under slight compression, and under the actual test gave an actual compression on the control spring equal to a load of 80 cwts.

The crane was weighed, when lying quite level with

Gauge glasses on boiler ..	5-in. of cold water.
Tank	Full.
Bunker	,, of coke.
Tools	All on board, and

Crane jib supported as on match trucks.

The springs took the full weight of the crane and resulted as follows :

	L. H.	R. H.	T. C. Q.
1st fixed axle	9–13–0	10– 9–0	20– 2–0
2nd ,, ,, ...	9–18–0	10– 7–0	20– 5–0
3rd ,, ,, ...	9–18–0	10– 3–0	20– 1–0
Bogie	6–10–0	7– 9–2	13–19–2
	7–18–3	8–19–0	16–17–3
	T. 43–17–3	T. 47– 7–2	T. 91– 4–5

The crane was also tried with the match truck through the running gauge and was clear.

All machine cut gears bear the full length of teeth running very quietly.

Boilers, slewing pinion and rack were perfect and the slewing friction clutches worked without heating and all bearings were quite cool.

The boiler, boiler fittings, pump, injector and all other fittings and attachments were all satisfactory and in proper order.

A Belgian Mission to China

A BIG effort is being made by Belgian manufacturers, aided by the government, to extend their foreign trade. Under the auspices of the comité central industriel, a Belgian organization similar to the federation of British industries, a mission, comprising representatives of the leading firms of the country, has started for the Far East with the avowed object of recapturing prewar markets for Belgian goods in China and Japan, which have been practically lost since the war.

A similar mission was organized by the government about a year ago under the direction of M. Rouma which, during the course of 1922, visited the various South American republics and carried out a program of trade propaganda for Belgian industry. Its effects are becoming apparent. Some months ago Brazil placed considerable orders with Belgian metallurgical firms, and now the Argentine republic has placed an order with the Comptoir des Aciéries belges for 30,000 tons of rails (37 k.g.), as well as for railway accessories. A further order for 54,000 tons of rails is announced, and negotiations have been opened in connection with the supply of 25 locomotives and 2,000 waggons.

The Polish government has just placed an order for 180 locomotives and for railway materials, comprising signals, points, bolts, etc. The total value of foreign orders amounts to hundreds of millions of francs and will have the twofold effect of providing employment and improving the value of the Belgian franc.

The economic mission to China and Japan left Marseilles for Kobe on February 25. The mission is under the leadership of the well-known Mons manufacturer, M. Cannon Legrand, who will be accompanied by several technical experts, representing the following :—The Société John Cockerill, the Société Anonyme Ougrée-Marihaye, the Société La Brugeoise et Nicaise et Delcuve, the Maison Peltzer, of Verviers, the Forge de la Providence, the Société Anonyme d'Espérance Longdoz, the Nouvelles Usines Bollinckx, the Cableries du Hainaut, the rolling material manufacturers, the machine tool makers, etc. The mission also includes a delegate of the Banque Belge pour l'Etranger.

Tientsin-Pukow Trains de Luxe

THE Tientsin-Pukow Railway have recently replaced their old wood express trains, operating between Pukow and Peking, with five modern de luxe new semi-steel trains which were supplied by the Pressed Steel Car Co. of New York. Each train consists of one each baggage car, postal car, dining car and drawing room car and two each first-, second- and third-class coupé sleeping cars. Three new semi-steel private cars, supplied by the same builders will shortly be placed in service for operation with the new trains.

These cars of American manufacture represent the last word in modern car construction, and afford the latest facilities for the comfort and safety of the traveling public. They not only excel the best trains in Asia, but will compare favorably with any in Europe or America. The order is the largest and most important for high-class export passenger equipment and was the result of an invitation extended several years ago by the Tientsin-Pukow Railway authorities to several leading car builders to submit designs and send an engineer to China with samples, etc., to recommend, discuss and settle details with them for first-class passenger car service.

The Pressed Steel Car Co. opened an office in China during 1919, under the general management of Mr. H. R. Cooper, with a qualified engineering staff to cope with any problems pertaining to either freight or pasenger trains, and in due time their chief engineers, after many conferences with the various department heads of the railway, worked out preliminary plans and specifications to meet not only the requirements of the railway company, but also conforming to the principal dimensions and fundamental features as decided upon by the commission on railway technics, consisting of a number of foreign railway advisers working under the jurisdiction of the ministry of communications for the purpose of working out standards for the railways of China, after conferences with the mechanical heads of all the railways of China. It might be mentioned that Mr. Shu Shih-chang, former managing director, in line with the other progressive improvements that he had under way on the Tientsin-Pukow Railway, at the time, made it clear that he wanted trains the superior of any in Asia, and the results are due to his initiative.

The proposition of settling details and insuring that the trains came up to the expectation was placed in the hands of Mr. Tsai Kuo-tsao, former chief locomotive and works superintendent, one of the most capable, energetic and conscientious Chinese that has occupied an important motive department position on the Chinese railway. The various features and details were developed after numerous conferences between Mr. J. Alston, Mr. Tsai Kuo-tsao and Mr. W. M. Peach, chief engineer, Far Eastern district, for the Pressed Steel Car Co., as well as interviews with the heads of the traffic and dining car departments. The final decisions, approval and selections of samples were made by Mr. Tsai, through whose efforts and judgment the arrangement, design and appearance of the trains are as the traveling public find them.

Due to the time required in settling the various details, discussions at various standardization conferences and the rapid deterioration of the old equipment, the contract was placed promptly with the only company having a qualified engineer on the ground to communicate to the works the voluminous details that had been discussed. The order was placed through William Forbes & Co., Tientsin, late in July, 1921 and the first twenty-five cars delivered at Pukow during August the following year and delivery completed in October.

The cars were built at Pittsburgh and Wilmington. The cars were erected at the builder's works under the inspection of the well-known British firm of engineers and inspectors, C. P. Sandberg & Co. The cars were lettered, ornamented, painted and varnished, after which they were dissected and shipped in sections; the underframes being shipped in three pieces; each side in four sections with windows, curtains and glass assembled; each body end with door assembled was shipped complete, likewise the vestibule ends. The interior partitions were also shipped assembled with glass, etc., in position.

On arrival in China, the sections and parts were assembled at the Tientsin-Pukow shops at Puchen under the direction of Mr. John Alston, locomotive and works superintendent of the line. The erection was started September 1, 1922, and the trains were ready for service about the middle of January, a record for this volume and type of equipment.

The cars conform to the following principal dimensions :—

Sleeping Cars and Drawing Room Cars.

Length over body	65′ 7¾″
Distance between bogie centres	51′ 10″
Length overall coupled in train	74′ 1″

Baggage Cars and Postal Cars.

Length over body	65′ 7¾″
Distance between bogie centres	49′ 2½″
Length over all coupled in trains	67′ 2½″

Dining Cars.

Length over body	72′ 6¼″
Distance between bogie centres	54′ 5½″
Length over all coupled in train	75′ 5″

Private Cars.

Length over body	67′ 7¼″
Distance between bogie centres	53′ 9½″
Length over all coupled in train	77′ 3¾″

All Cars.

Width over side sheathing	10′ 0″
Width over eaves	10′ 1¾″
Top of rail to top of roof	14′ 2″
Wheel base of bogie	8′ 0″
Journals	5½″ × 10″

The general design for all the cars is the same, as follows :

Under Frame

The underframe is of the through four sill type. The centre sills are 12-in. eye beams, 31½-lbs. spaced 16-in apart. The side sills are 10-in. ship channels 28-lbs. The body end sills consist of ⅝-in. web plates with a continuous 18-in. by ⅝-in. top anti-telescoping plate. The platform end sills are of cast steel.

The body bolsters or transoms are the two member forged truss type, each member consisting of a 10-in. by ¾-in. top and a 10-in. by ⅞-in. bottom tie. There are four cross ties or needle beams to each car consisting of a 13-in. by ⅜-in. top tie plate and a 7-in. channel 9¾-lbs. bottom member with two ⅝-in. web plates. The intermediate cross ties or floor supports are 5-in. channels 6½-lbs.

The baggage cars and postal cars are trussed with four and the other cars with two 2-in. truss rods, which were introduced to allow of maximum amount of assembly including painting and varnishing before shipment, and thus reducing the work at destination to a minimum.

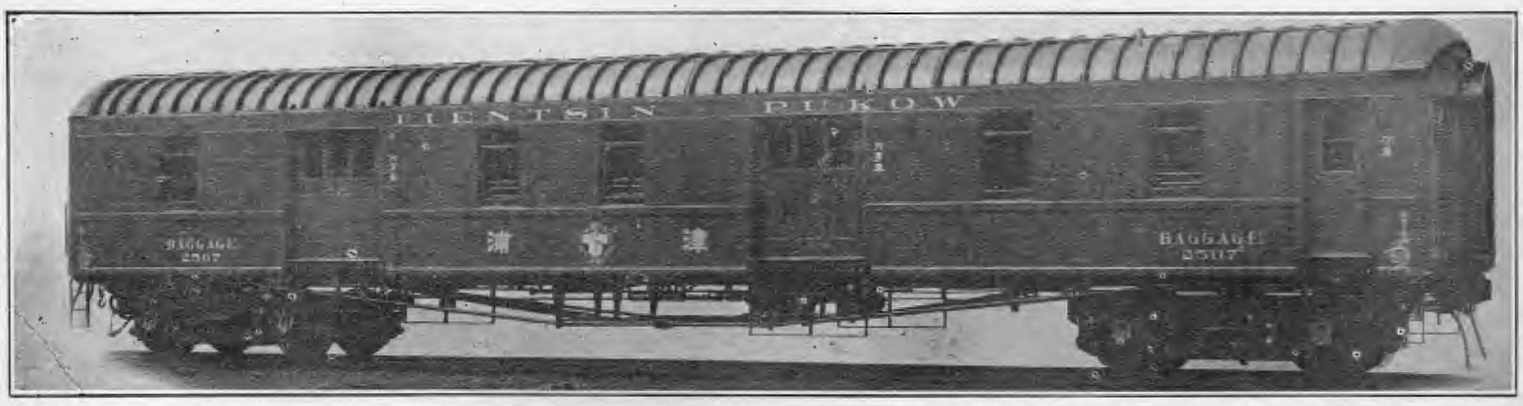
Body Construction

The vertical members of the side frame are 3-in. by 2-in. by ¼-in. angles extending from side sill to side plate, the spacing being arranged to suit the window and door openings for the

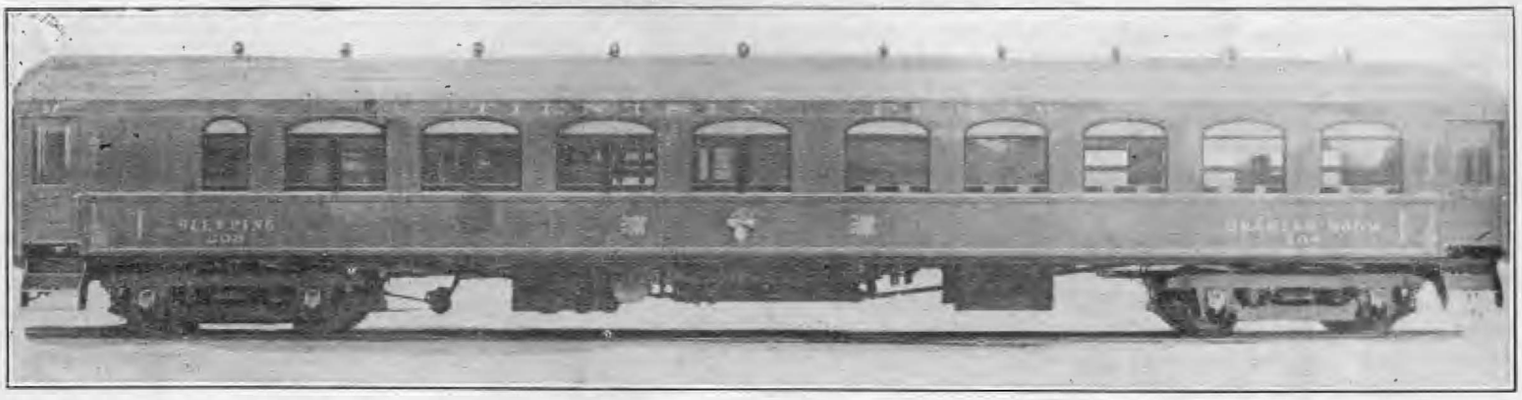
THE CARS FOR THE FIVE TRAINS DE LUXE FOR

Supplied by the Pressed Steel Car Company with

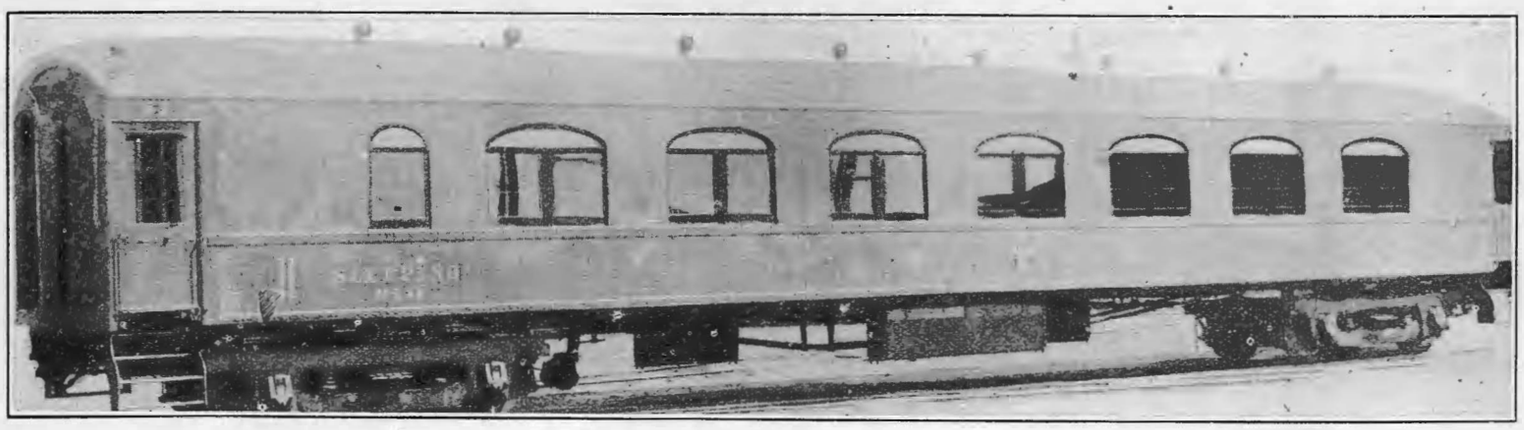
Erected at the Puchen Shops of the Tientsin-Pukow Railway Under the



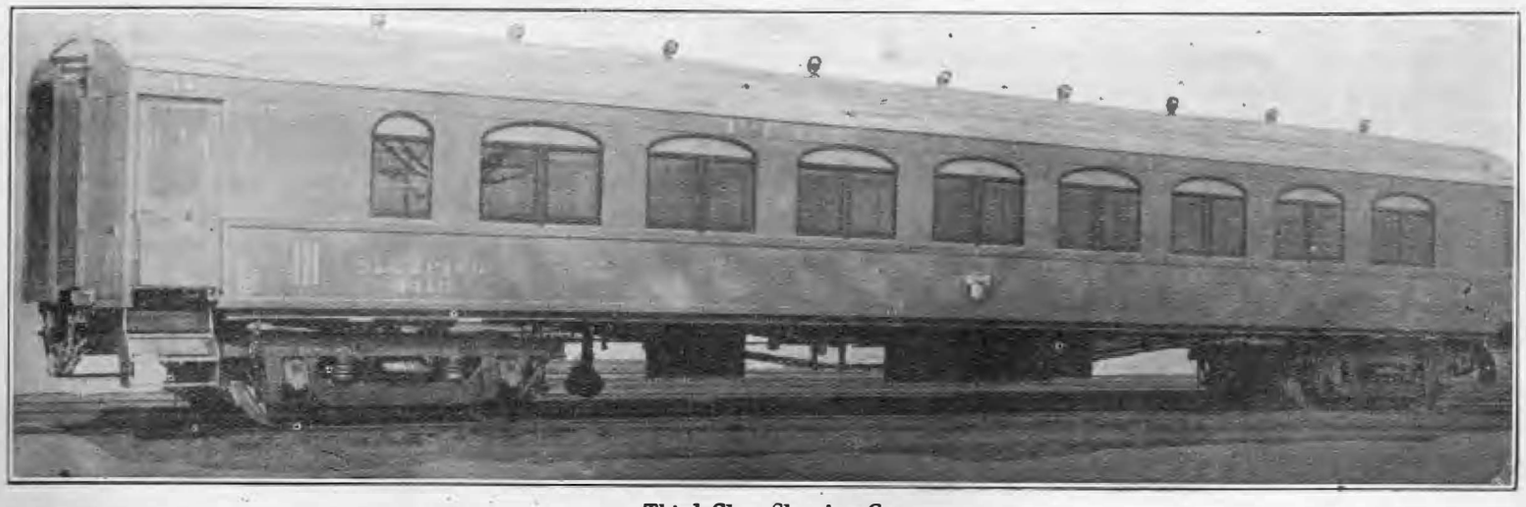
Baggage Car



1st Class Compartment Sleeping and Drawing Room Car



Second Class Sleeping Car



Third Class Sleeping Car

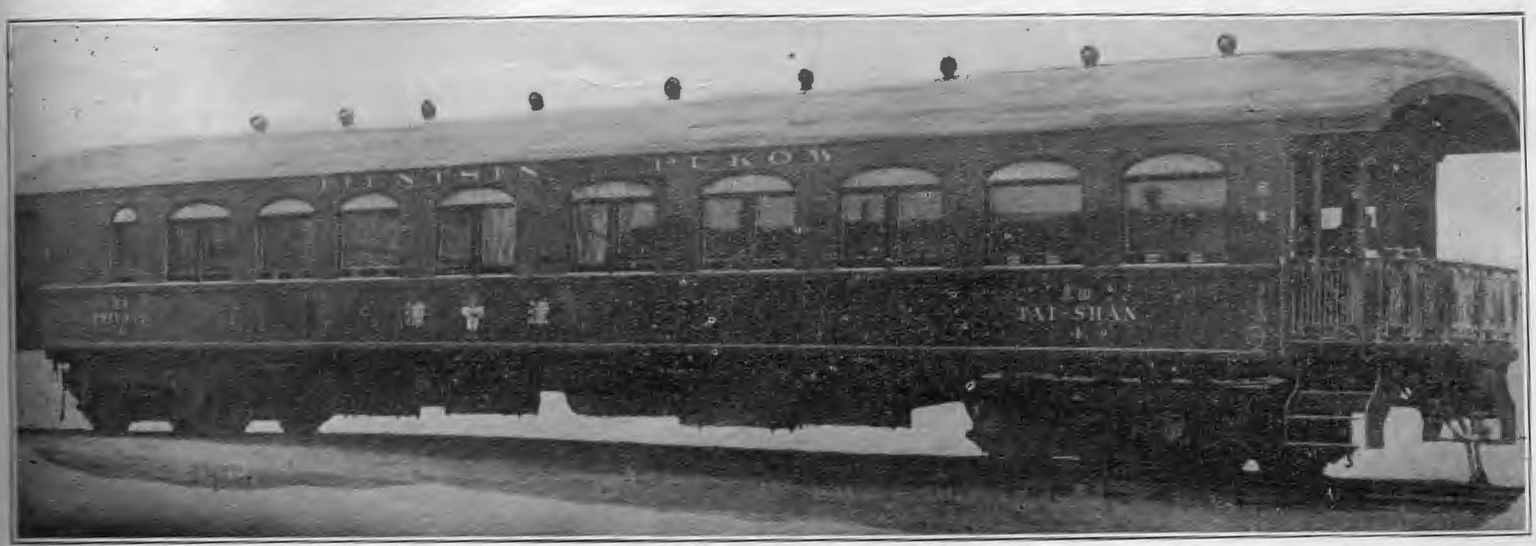
SERVICE ON THE TIENTSIN-PUKOW RAILWAY

Materials Supplied by the United States Steel Corporation

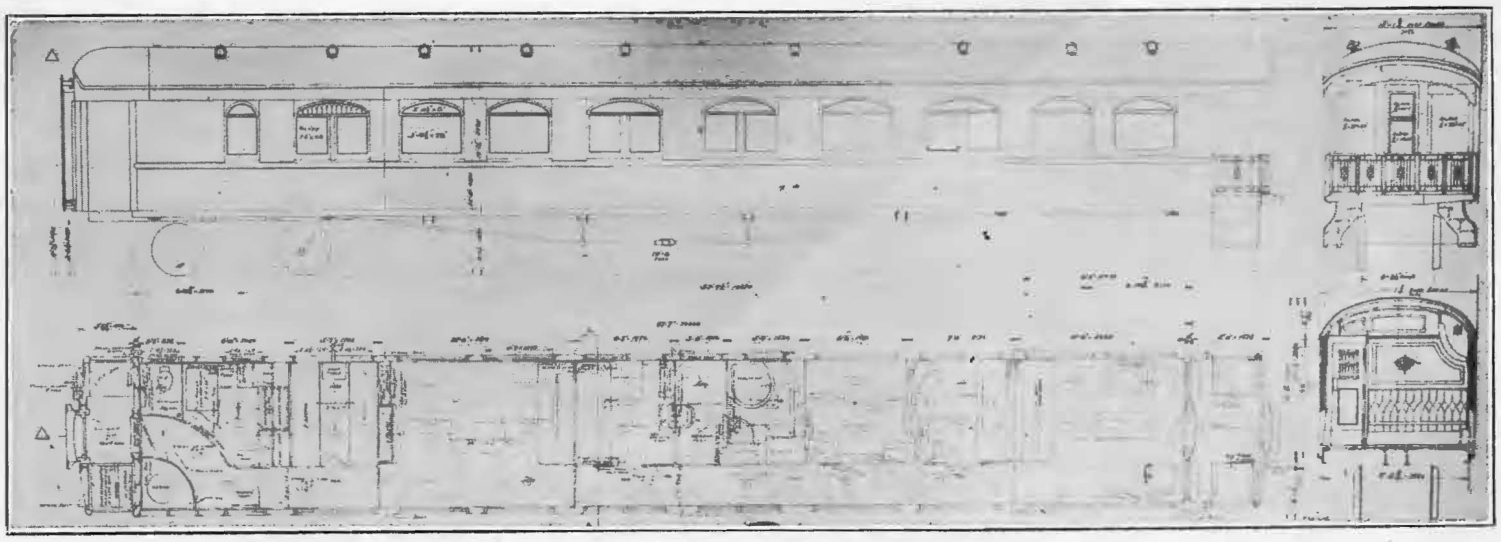
Direction of John W. Alston, Locomotive and Works Superintendent

Dining Car

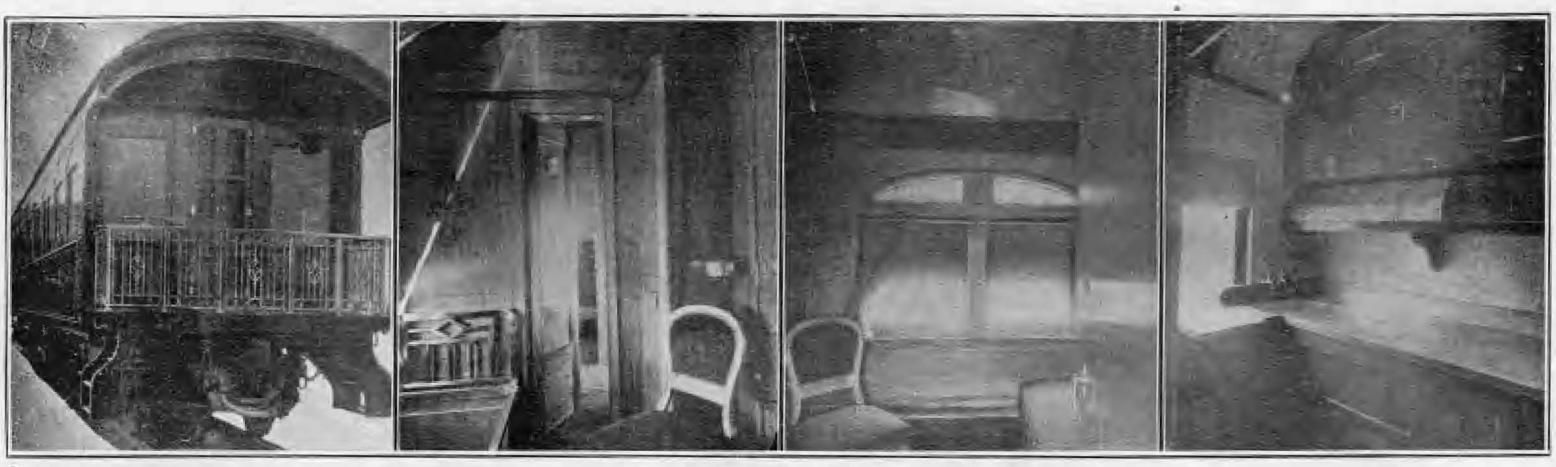
1st Class Sleeping Car



Private Car "Tai-Shan"



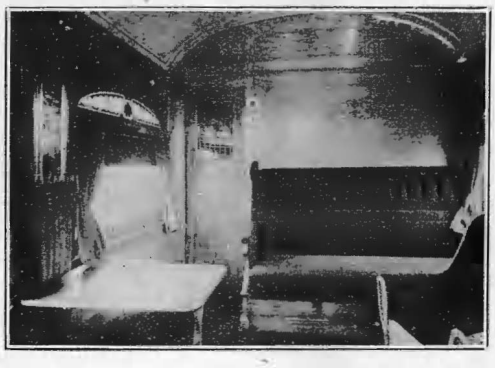
Private Car "Tai-Shan". General Floor Plan



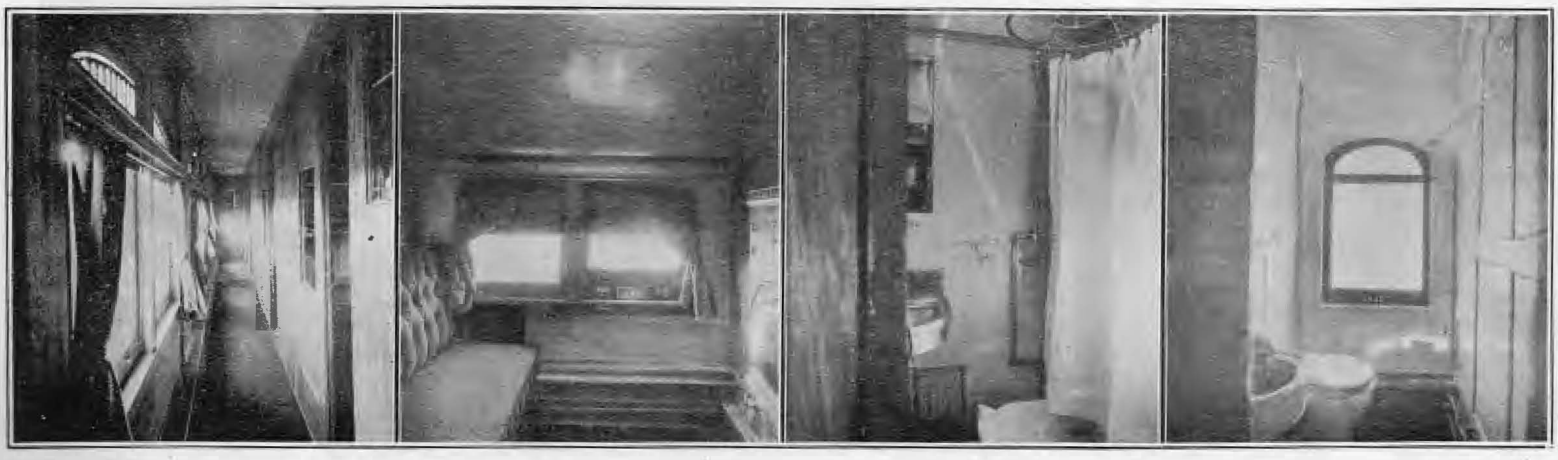
Observation Platform | Bed Room | Bed Room | Pantry

Dining Room

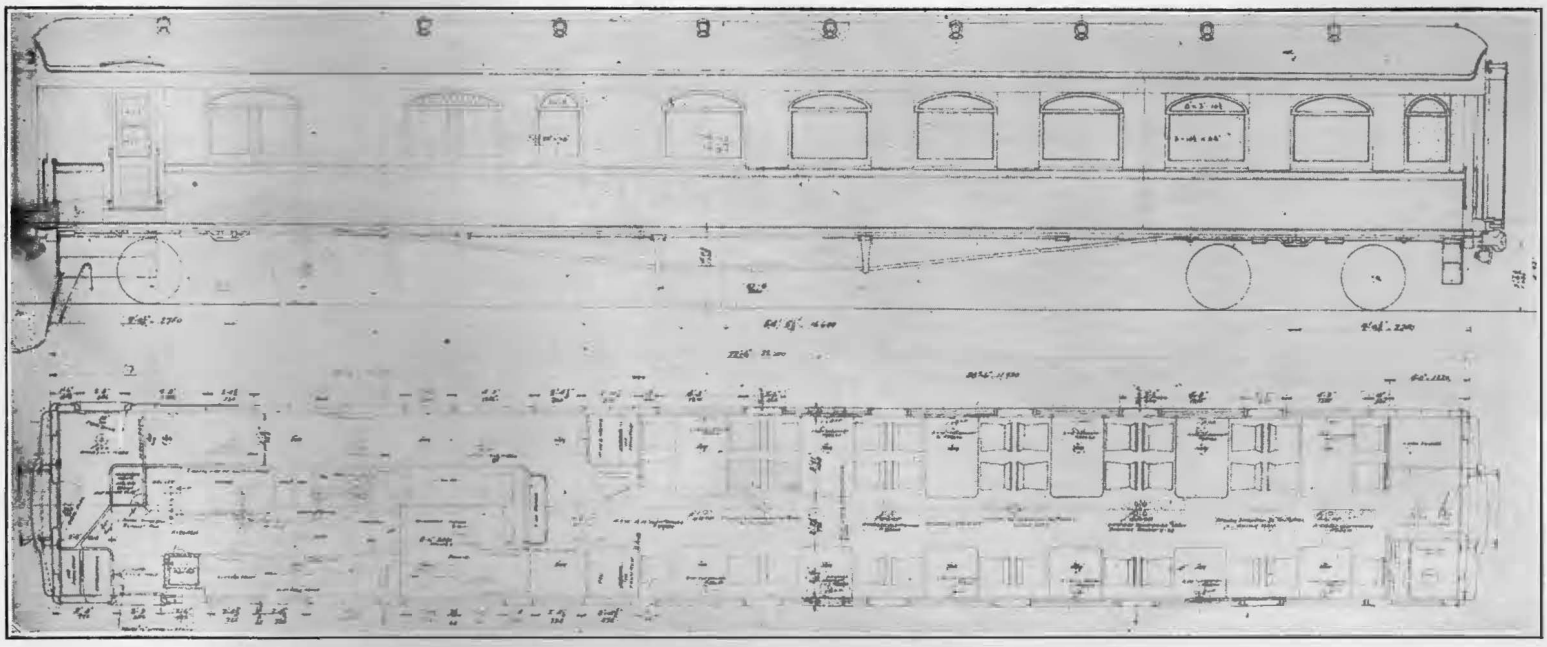
Observation Room



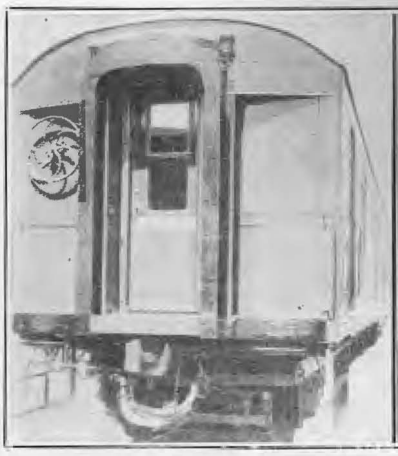
Bed Room



Corridor | Bed Room | Shower Bath | Toilet and Lavatory



General Floor Plan of Dining Car

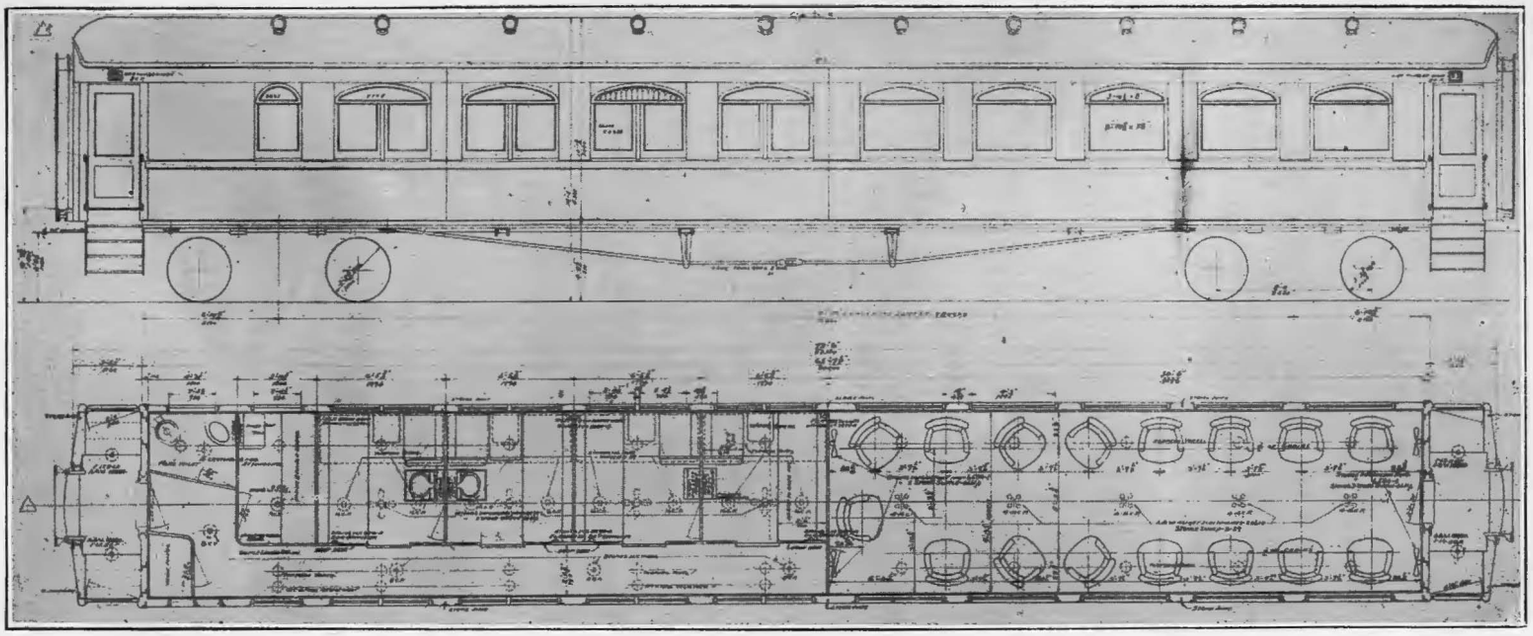


End View

First Class Dining Car: Showing Side Board

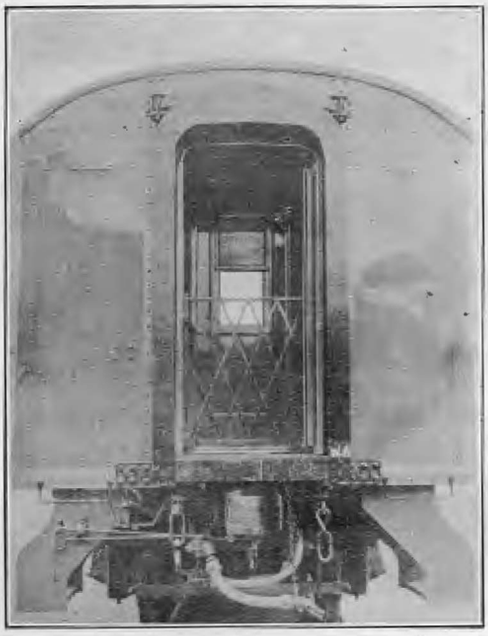
Kitchen

Interior of Dining Car



General Floor Plan of First Class Sleeping and Drawing Room Car

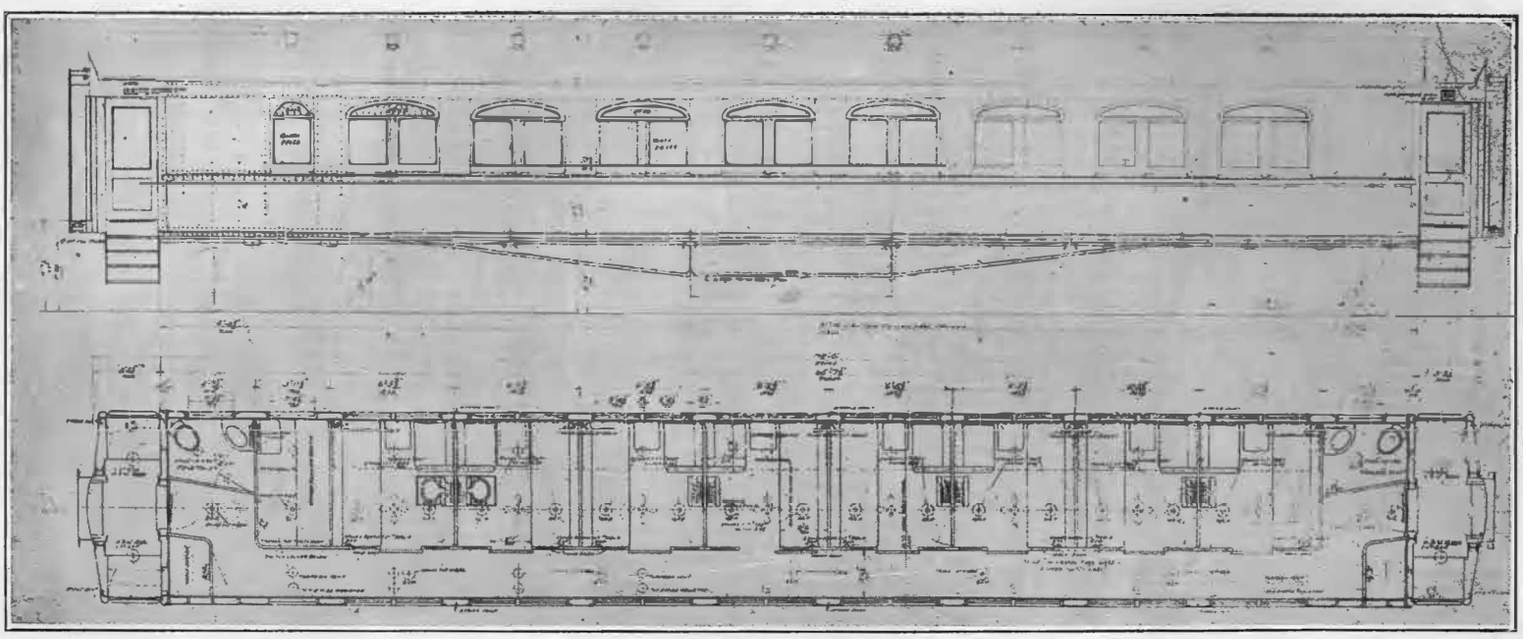
Corridor



End View

Compartment: showing Pullman Type Upper Berth

Interior of Drawing or Observation Room

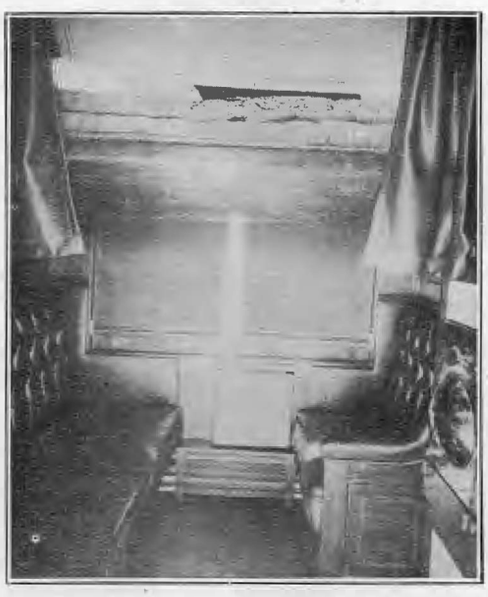


Plan and Elevation of First Class Sleeping Car

Interior of Sleeping Compartment Showing Door

End View

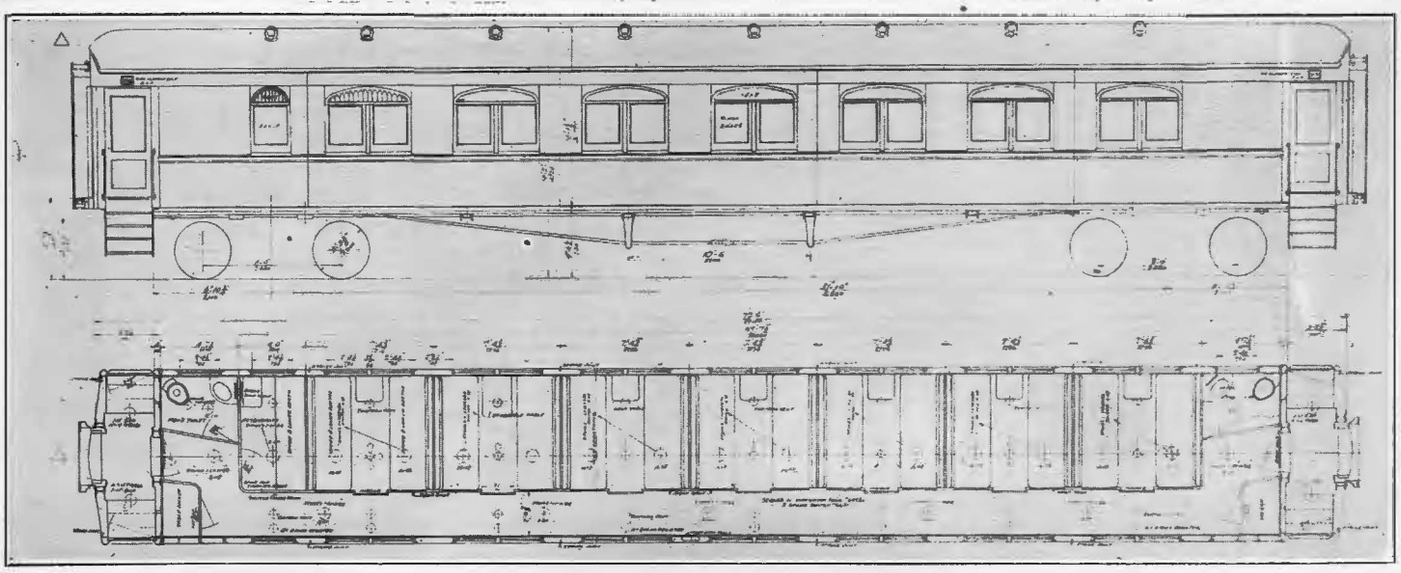
Corridor



Interio- of Sleeping Compartment Showing Upper Berth Open; Washstand Closed

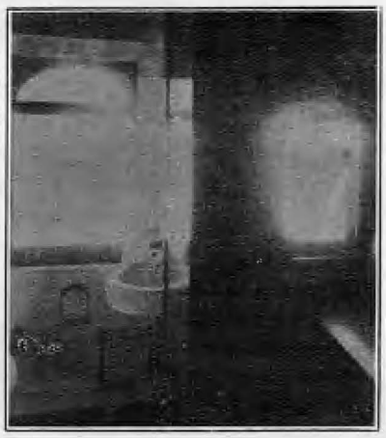
Interior of Sleeping Compartment showing Upper Berth Closed and Washstand Open

Lavatory and Toilet; Attendant's Room



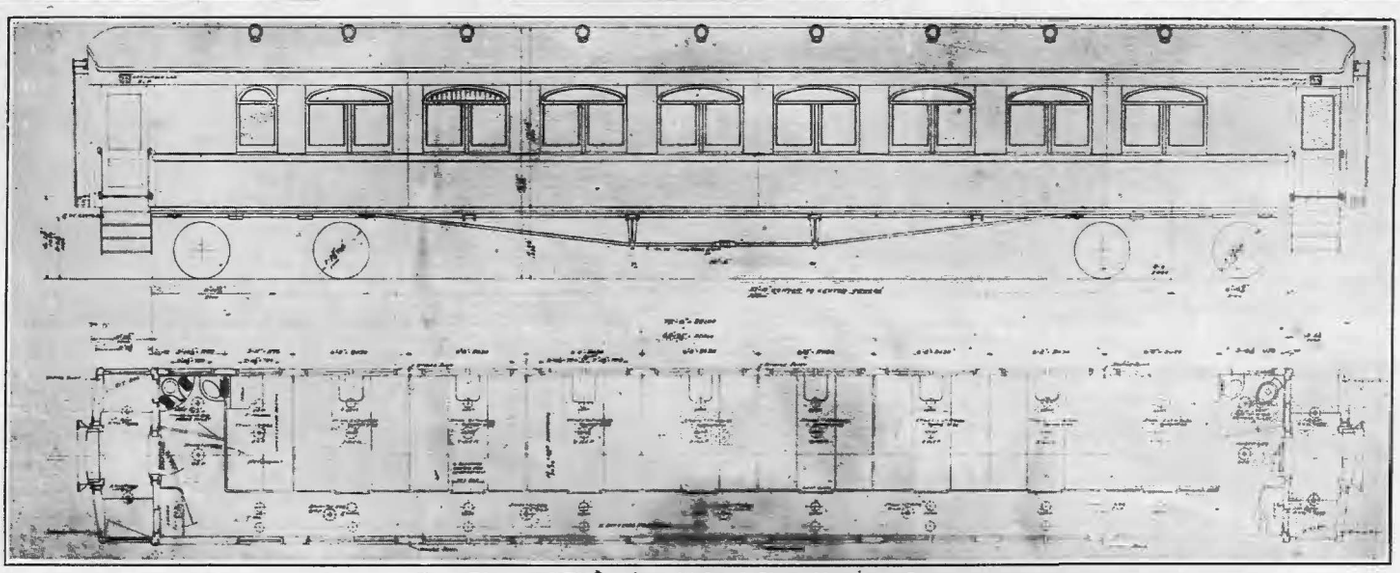
Plan and Elevation of Second Class Sleeping Car

Corridor



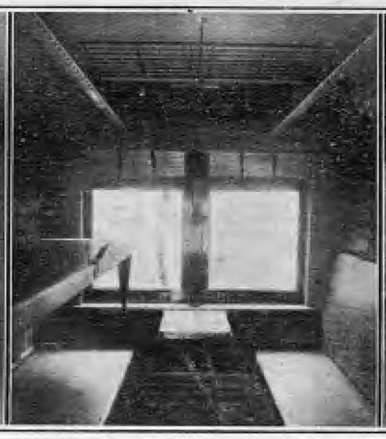
Lavatory and Guard Room

Interior Sleeping Compartment



Plan and Elevation of Third Class Sleeping Car

Lavatory and Guard Room



3rd Class Sleeping Compartment: 6 Berths each

Corridor

End View

various types of cars. The belt rail is a 4-in. by ½-in. bevelled edge bar. The side plate is a 3-in. by 3-in. by ¼-in. angle. The side sheets, end sheets and letter board are ⅛-in. levelled steel.

The end construction for the vestibuled cars consists of four vertical 6-in. "H" beams, 23.8-lbs. at each end, one located each side of body end door and at each side of passageway opening at end of vestibule. At the body end between the door and corner there are two vertical 4-in. "Z" bars. The dummy or stub end cars, namely, baggage cars, postal cars and dining cars, have a vertical 12-in eye beam, 31½-lbs. each side of the end door and two vertical 4-in. "Z" bars between the door and each corner of car. The end construction is unusually heavy and strong when compared with other cars in China, due to making this feature conform with American practice of following the United States railway mail service requirements, stipulating a minimum section modulus of 65 for the vertical end members at each end of car, of which those members adjacent to the doors are to have 75 per cent. of this amount. Special attention is drawn to the strong end construction which is intended to withstand impacts from wrecks and collisions, eliminate possibility of telescoping and restrict the damage to the ends of cars, so as to reduce personal injuries to a minimum.

The roof is of ¾-in. tongue and grooved wood covered with canvas to conform with latest tendenies of passenger car construction.

The floor construction consists of a ⅛-in. copper bearing steel sub floor, over which is a 1-in. dead air space, followed by another course of sheet steel on which rests a layer of ¾-in. hair felt insulation. Above the insulation is a course of 1⅛-in. tongue and grooved wood supporting a ⅝-in. thickness of Monolith composition cement secured with wire netting. The sides and ends are insulated with ¾-in. Salamander, secured by means of wire nails arc welded to the sheets.

Interior Finish

The interior finish for the first class sleeping cars, dining cars, drawing room cars and one of the private cars is red mahogany with neat inlay lines and artistic marquetry inlay designs. The finish for the other two private cars is white mahogany. The finish for second-class sleepers is quartered oak; for the third-class sleepers pitch pine and steel for the baggage cars and postal cars.

The floors for all first-class cars are covered with high-grade Wilton carpets, the halls, toilets and vestibule floors being covered with red and green square rubber tile. The floors of second-class sleeping cars are covered with brown linoleum.

The upholstery for first-class coupés and dining cars is brown Spanish leather; for the drawing room green short nap figured plush, and fabricoid for the second- and third-class sleeping cars. Ceilings are white with ornamentation for the first-class cars. The windows in dining cars, drawing room cars and private cars are fitted with draperies of sun fast figured material.

General Features

The ventilation is the exhaust type by means of torpedo roof ventilators drawing from a continuous space from end to end of car between the roof and ceiling. The ventilation is regulated by "Hit and Miss" type of registers located in the ceiling and arranged so the various coupés or sections of the cars are regulated independently. In addition, air intake ventilators are provided at the bottom of the windows in first- and second-class cars.

The heating is the "Gold" vapor system with independent control for the coupés of first- and second-class sleeping cars. With the vapor system, the steam from locomotive is regulated by an automatic device so that there is no pressure in the pipes inside of car.

All steel used in the cars and bogies, as well as axles and wheels was supplied by the United States Steel Corporation.

The exterior of the cars is royal blue with gold ornamentation and lettering in English and Chinese. At the centre of car there is a coat of arms specially designed for these trains consisting of a wreath of Chinese wheat, surrounding a shield containing the five colors of the Chinese flag with the yellow bridge as representing one of the important engineering structures on the system. There is also included the winged wheel representing progress, and the initials T.P.R. in English and the characters for Tsin-Pu.

The lighting equipment is the Stone 24-volt system with Tonum batteries. All materials for the lighting were supplied by the Stone Co., with the exception of the lamps in the dining room, drawing room and principal rooms in private cars, which were designed and manufactured in America so as to harmonize with the general interior scheme of these rooms.

The table equipment for the dining cars and private cars was supplied by the builder and include Hotel Ambassador design of forks, knives and spoons, the remaining silverware being one of the latest designs of the International Silver Co. The chinaware is Lamberton style. The table covers and napkins are of Irish linen. Glassware, silverware, china and linen are marked with the Railway Company's monogram. The table equipment supplied is in excess of present requirements and will suffice should *a la carte* service be inaugurated at a later period.

Air brakes are the Westinghouse with two shoes acting on each wheel.

The various sleeping cars and drawing room cars have an illuminated car number sign over the steps that can be adjusted to show numbers from 1 to 99. These cars are also fitted with illuminated toilet room designation signs so passengers on looking out of the coupés can determine which direction to proceed.

All first- and second-class cars are fitted with annunciators located in attendants' room so they can determine exactly by which push button the call was made.

Special Features

The following are special features that represent a new departure for Chinese railway passenger equipment:—

Spring actuated steel gangway connections or diaphragms between cars.

Wide vestibules and platform trap doors with easy access and egress steps covered with anti-slip treads.

Permanent sliding window screens.

Hot as well as cold running water for washbasins of first-class cars.

Large and conveniently located windows that permit of clear view while seated in a comfortable position.

Water tanks underneath of car for first-class cars and forced to faucets by air pressure system.

Brake slack adjusters for automatically maintaining a constant air brake piston travel.

Metal conduit system for wiring, permitting of replacing and repairing wires without disturbing the finish.

Safety chains between cars eliminating possibility of train separation in case of broken coupler or damaged draft gear.

Air train signal allowing of signalling the engine driver from any car in cases of emergency.

Solid rolled steel wheels.

Roller side bearings between body and bogies.

Pivotted head spring centering couplers.

Ground level filling arrangement for overhead water tanks, eliminating necessity to climb to top of cars.

General Arrangement of Cars

The first-class sleeping cars have eight coupés, each accommodating two passengers, quarters for two car attendants and two toilet rooms. In the coupés there is a sofa extending crosswise of car the full length of the coupé and which is used for the lower berth at night. On the opposite side next to the window, there is an individual seat which permits both occupants to be seated next to the

window. The upper berth is the Pullman fold-up type located above the windows and running lengthwise with the car. This type of upper berth presents a roomy coupé during the day time and is used for storage of bedding. There is a folding lavatory to each coupé and each pair of coupés is connected by a communicating door. Berth reading lamps are provided for both berths also curtain for the upper berth. A small drop down table is provided in each coupé, also sockets for the application of a larger removable table for use when card playing or dining in coupé.

The drawing room car has four coupés exactly like those for the first-class sleeping car and a room with sixteen revolving parlor car chairs in addition to quarters for two attendants and a toilet room. The windows in the drawing room are wide with art colored glass above, and this car might be styled an observation car.

The second-class sleeping cars have seven coupés, each accommodating four passengers ; quarters for two car attendants and two toilet rooms. The seats are used for lower berths, the seat backs for the upper berths, the back being pivotted and held in raised position by two leather covered chains. Each coupé has a small drop table and sockets for a larger removable table.

The third-class sleeping cars have eight coupés, each accommodating six passengers, quarters for two car attendants and two toilet rooms. The uppermost berth is permanent and can be used for luggage during the day time. The seats are used for lower berths and the back for the middle berth by being swung up and supported by two hinged legs.

The dining car has a dining saloon accommodating 36 persons at one time, there being six tables on one side for four persons and six on the opposite side for two persons. The tables are removable and are covered with a milk colored glass. The chairs are loose and can be placed as close to the table as one desires. The windows are spaced central with the tables and are wide so as to give a clear view when seated at the tables. Art colored glass is provided over the windows. At one end of the dining room there is an office for the steward, with linen lockers at the opposite side. At the other end of dining car there is a buffet having a side-board and two refrigerators, one for wines and the other for fruit.

Next to the buffet is the pantry and kitchen of the latest arrangement and containing all the modern conveniences for dining cars. The pantry contains overhead lockers, sink with hot and cold water chill boxes for provisions and iced chambers for milk, etc.

The kitchen is equipped with a Stearn's range, broiler, steam table, refrigerator, chill box, overhead lockers, special containers, sinks with hot and cold water, dish and glass racks, plate warmers, coffee urns, warming ovens. The water supply is from overhead tanks which can be refilled from the air pressure water tank underneath the car. The hot water supply for sinks and steam table is from storage tanks and water backs in range. Provision is made so steam can be drawn from the locomotive as an auxilliary for quick heating steam table, also, so cold water at the sinks can be drawn direct from the air pressure tank.

The refrigerators are porcelain lined with syphons separating the provisions and meat from the ice chamber. Lights inside of refrigerator are turned off and on automatically with the operation of the door. The wine refrigerator is equipped completely with pull out type of bottle racks.

The kitchen is fitted with a large roof ventilator, also an exhaust blower. A hallway is provided at side of kitchen so that passengers pass through the car without going through the kitchen.

The baggage car has a corridor extending the full length of car. The baggage space is partitioned off in two equal sections. At one end of the car there are quarters for the train crew including a bunk room fitted with two berths and a special strong box for station revenue, which can be dropped into the receptacle, but cannot be removed except by unlocking the door. This room also contains a fire extinguisher, stretcher and first aid outfit. At the other end of car there is a toilet room for the train crew.

The postal car has quarters for the train guard at one end, the remaining space being divided into two sections, one for parcels, the other being in accordance with and containing all the appurtenances as used in American postal cars, which permits of assorting and distribution of mail *en route*.

The private cars are alike except two are finished with light wood and one with dark. In addition, the latter has an additional room, fitted with brass bed instead of a library. The general arrangement of the former is as follows : The observation or sitting room contains five large wicker chairs and a sofa which can be made into two berths by swinging up the back and applying curtains. At the observation end there is a platform with brass railing and awning, folding seats being used. Next to the sitting room is a library containing a sofa that can be made into two berths, a large wicker chair, writing desk and a small chair. Accessible from hall or by communicating door at library is a bed room containing a brass bed, wardrobe and dresser. Connected with the bed room is a bath room containing a shower bath, stationary lavatory and hopper. Next to the private toilet is a general toilet room accessible from the hall containing a lavatory and hopper. Next, there is a coupé or guest room which is a duplicate of the first-class sleeping car coupé except a large wicker chair is introduced instead of the small seat.

The dining room contains a side-board, extension table, six chairs, writing desk, book case and a sofa that can be made into two berths by swinging up the back and applying curtain. The servants' quarters adjacent to the dining room have accommodations for four servants. Following this is a kitchen fitted with a Stearn's range and broiler, also sink, chill box, lockers, etc. The refrigerator for supplies is located at one side of vestibule and is the same as described for the dining car. At this end, there is a toilet room for the servants and an individual hot water heater.

The private cars are equipped with a dual heating system, that is, they may be vapor heated with steam from the locomotive when in operation or by an independent hot water system when on a siding where no steam supply is available.

The dining room is upholstered with green leather, the bed rooms and sitting room with green short nap figured plush and the servants' sections with fabricoid. The finish at kichen end of car is of oak.

Bogies

The bogies or trucks are of the four-wheel American equalizer type of structural steel construction. The wheels are metre diameter of solid rolled steel one piece type. The axles are open hearth steel with 5½-in. by 10-in. journals. The journal or bearing boxes are of cast steel with top hinged spring closing lids. Side bearings are the Stucki roller type. Brake beams are of the trussed type with removable shoes. The trucks are alike for all of the cars except for a slight difference in the springs to compensate for the difference in weight of the various types of cars.

With a trip of the duration of the one from Peking to Pukow it is obvious that trains should be made as comfortable as possible. As many important Chinese as well as foreign visitors and leading foreign business men make this trip, it is just as necessary that the cars should be made safe. It is hoped that the Chinese railway officials and those employed on the cars will take care of the splendid equipment under their care. This remains to be seen, but from the handling of the trains during the past fortnight, it appears that they are going to deteriorate rapidly and prove that they are in advance of what the car attendants might be expected to keep in proper order, unless we have enthusiastic hopes that the Chinese might in time adopt themselves to the modern equipment, keep them in clean and proper condition and handle the various features so the traveling public might benefit by what has been inaugurated for their comfort.

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

BLAST FURNACES AND STEEL MILLS IN CHINA

Manila and Singapore Water Supplies

Prai River Wharves

Electrical Development in Taiwan

Electrical Development in Japan

FAR EASTERN MOTORS

上海仁記路第五號

遠東時報

Vol. XIX | May, 1923 | No. 5

CHIERI

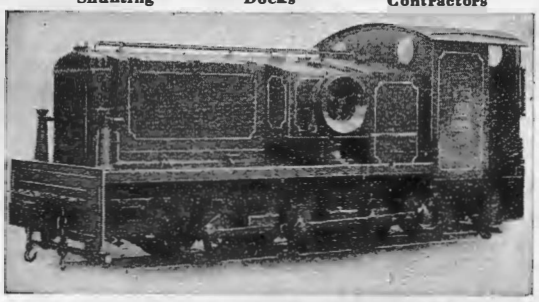
Contractors to: **The Admiralty, The War Office, The India Office, The Crown Agents for the Colonies, Colonial and Foreign Governments**

Internal Combustion Rail Cars, Inspection Cars, Coaches, Tramcars, Trailers, Locomotives, Tractors, etc.

British built throughout and supplied to upwards of 200 Railways in all Parts of the World

Designs to meet individual requirement.

Passenger Freight Shunting | Mining Harbours Docks | Plantations Logging Contractors



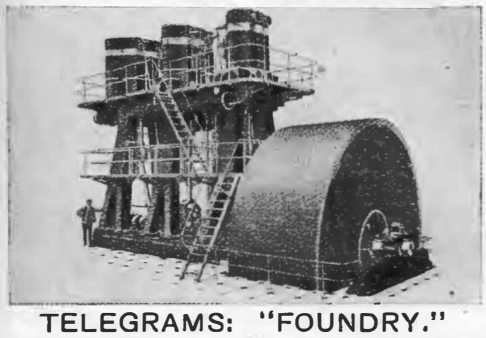
The Drewry Car Co., Ltd.

(and McEwan Pratt & Co., Ltd.)

13 South Place, London, E.C. 2
Telegrams: "Effervesce, London"
Works: Burton-on-Trent, England

ASHTON FROST & CO., LTD.

ESTABLISHED 1873.



MAKERS OF

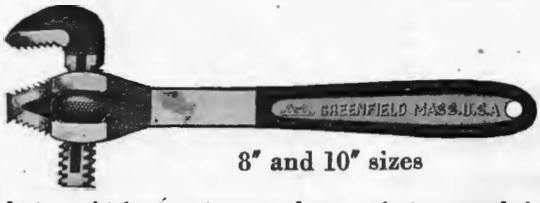
STEAM ENGINES,
MILL GEARING,
DEEP WELL PUMPS,
SEWAGE PLANT,
ETC.

TELEGRAMS: "FOUNDRY."

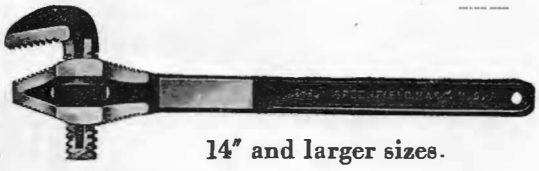
WORKS: **BLACKBURN, ENG.**

Little Giant—The New Pipe Wrench

"THE WRENCH WITH THE ORANGE HANDLE"



8" and 10" sizes



14" and larger sizes.

A new design which gives increased strength, increased simplicity, increased usefulness, *less* weight, and fewer parts.
The "*Little Giant*" Pipe Wrench has become popular at once because of the end opening jaws. It can be thrust straight on a pipe like a pair of pliers, and will be found useful in places which are beyond the reach of an ordinary pipe wrench.

The arrangement of the jaw, which can be engaged at will with 2 or 4 sets of teeth on the handle can be seen in the picture. These extra sets of teeth mean long life. The "*Little Giant*" Wrench is drop-forged and heat-treated throughout.
Merchants will be particularly interested in the light weight (less than an ordinary pipe wrench) and the few parts. The "*Little Giant*" has only 3 parts, which means a smaller investment in replacements. Any of our representatives will be glad to quote prices.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

Canadian Plant: Greenfield Tap & Die Corporation of Canada, Limited, Galt, Ontario.
Cable address: "Getede"

REPRESENTATIVES

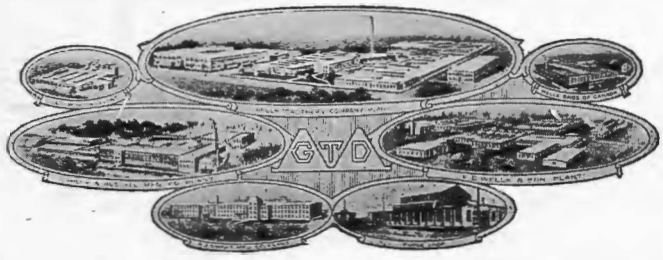
JAPAN.

MULLER, PHIPPS & SELLERS, LTD.
17 Itachibori Kitadori 5-chome, Nishi-Ku
Osaka, Japan
Fudo Bank Bldg., 9.2-chome
Honkokucho, Nihon-bashiku
Tokyo, Japan

HORNE COMPANY LTD.
6-7 Takayama-cho
Kyobashi-Ku
Tokyo, Japan

CHINA.

MULLER & PHIPPS (CHINA) LTD.
5 Ice House St.
P. O. Box 25, Prince's Bldg., Hongkong, China
2 Canton Road
Shanghai, China



Plants of **GTD** *Corporation, World's Largest Manufacturers of Screw-threading Tools*

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

BLAST FURNACES AND STEEL MILLS IN CHINA, II.

SIAM ADVANCING

RUBBER IN INSULINDE

PROGRESS IN RICE INDUSTRY

MANILA GAS WORKS

THE MANILA RAILWAY REPORT
A Splendid Achievement

JAPAN'S MACHINERY MANUFACTURERS

FORMOSA SUGAR INDUSTRY

THE TAIL OF THE DOG
Sidelights on the Origins and Impulses Behind the Opposition in China to Co-operation with Japan

AFTER LINCHENG, WHAT?

上海仁記路第五號

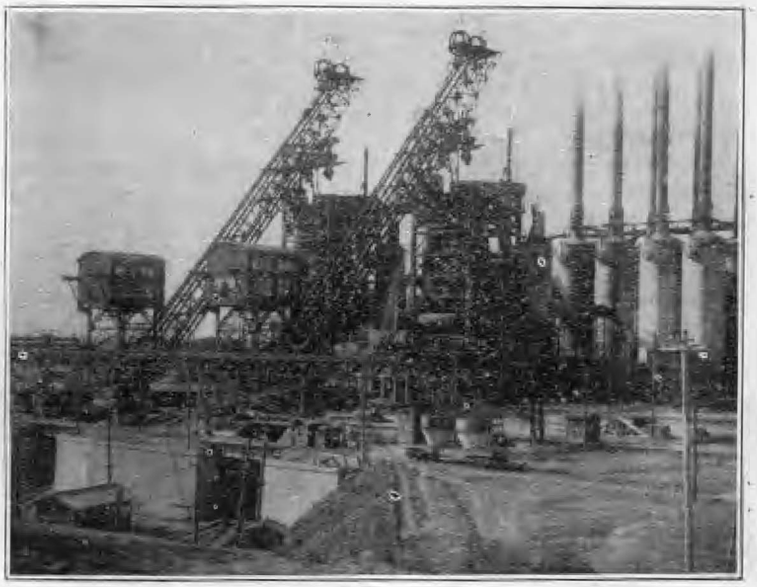
遠東時報

Vol. XIX June, 1923 No. 6

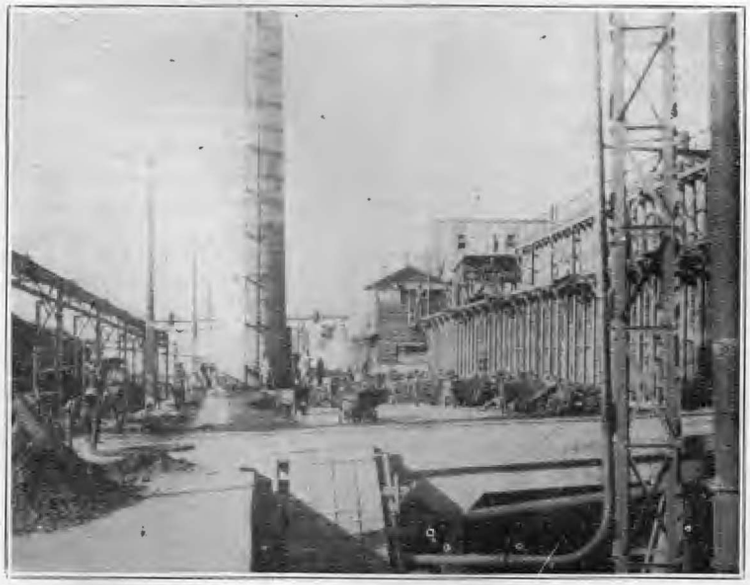
SHANGHAI, PEKING, TOKYO AND MANILA

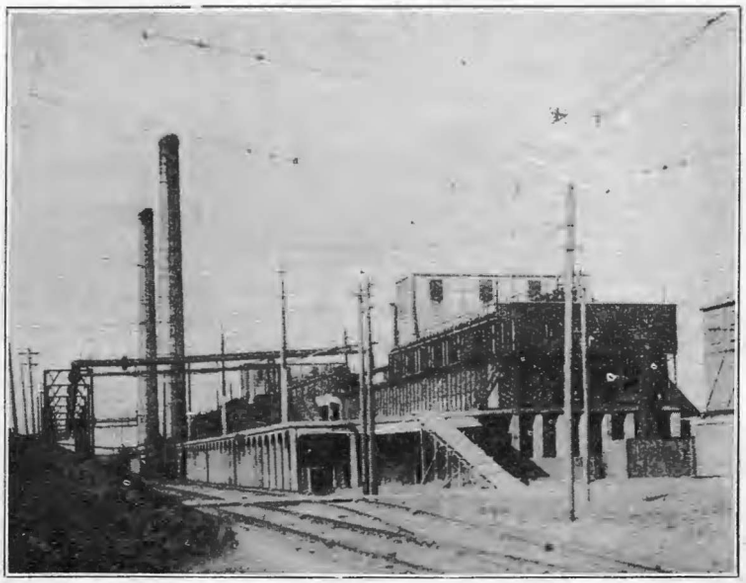
YINGTAOYUAN PIT, ANSHAN IRON MINES

Loading Platform at the Takushan Mine of the Anshan Group



Anshan Iron Steel Works



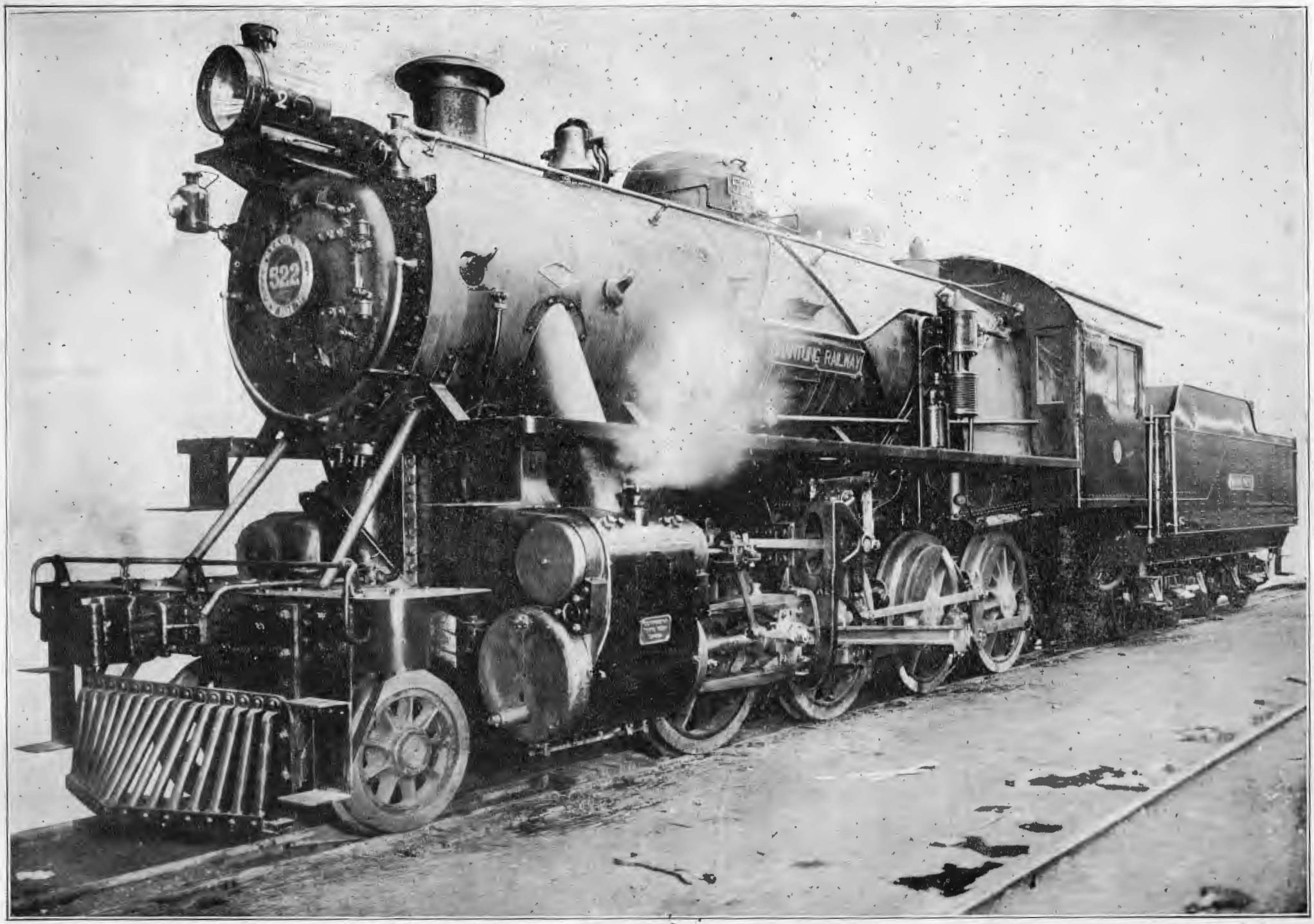


TWO VIEWS OF COKE WORKS ATTACHED TO ANSHAN IRON STEEL WORKS

JAPANESE-BUILT LOCOMOTIVES FOR A CHINESE RAILWAY

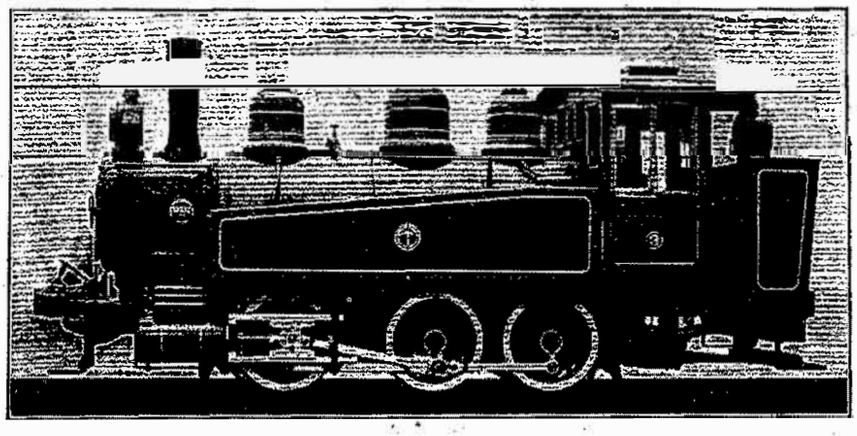
Type of Four Consolidation Freight Locomotives for the Shantung Railway, built at the Hyogo Works of the Kawasaki Dockyard Company, Ltd.

Gauge, 4-ft. 8½-in.; Cylinder, 21-in. by 26-in.; Driving wheel diameter, 54-in.; Boiler pressure, 180-lbs. per sq. in.; Grate area, 40.8 sq. ft.; Heating surface, 1,907 sq. ft.; Superheating surface, 436 sq. ft.; Wheel base, engine, 28-ft. 8-in.; Engine and tender, 53-ft. 8¼-in.; Weight in working order, engine, 159,500-lbs., tender, 104,700-lbs.; Maximum tractive force, 32,500-lbs.; Tender capacity, water, 5,000 gallons; Fuel, 8 tons.



BALDWIN

Six-Wheeled Switchers



SIX-WHEELED SHUNTING ENGINE BUILT FOR HOKKAIDO, KOGYO TETSUDO, K.K. (JAPAN)

SHUNTING ENGINE BUILT FOR HOKKAIDO, KOGYO, K.K. (JAPAN)

Gauge, 3 feet, 6 inches
Cylinders, 13 inches x 20 inches
Working pressure, 170 pounds
Fuel, soft coal
Driving wheels, diameter, 40½ inches
Weight, 72,700 pounds

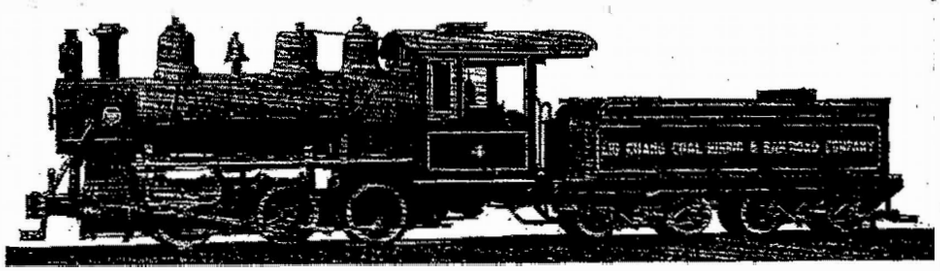
FOR light railway switching work, and especially where conditions call for narrow gauge and light track, the switching locomotives illustrated meet all requirements.

The locomotive equipped with tender, is adaptable for general work, either on long or short hauls. Both types of locomotives are easy on tracks and over light bridges.

We build light railway or industrial locomotives either to our own designs or to any specifications furnished.

BUILT FOR LIU CHANG COAL MINING & RAILWAY CO., CHINA

Gauge, 2 feet, 6 inches
Cylinders, 12 inches x 16 inches
Working pressure, 160 pounds
Fuel, coal
Driving wheels, diameter, 33 inches
Weight, engine, 40,700 pounds
Weight, engine and tender, 76,000 pounds



BUILT FOR LIU CHANG COAL MINING & RAILWAY CO., CHINA

OFFICES:

J. M. WRIGHT, Bandoeng, Java, D.E.I. J. W. KELKER, Harbin, Manchuria

AGENTS:

ANDERSEN, MEYER & CO., LTD., Peking and Shanghai SALE & FRAZAR, LTD., Tokyo and New York

RESIDENT TECHNICAL REPRESENTATIVES:

R. E. McFalls, Peking, China E. P. Williams, Jr., Shanghai, China

J. F. Greig, Tokyo, Japan.

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA, U.S.A.

Cable Address: "Baldwin, Philadelphia"

LOCOMOTIVES

See Map of Singapore p. 500

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

上海仁記路第五號

WAY FOONG

Hongkong Harbor Improvements

Japan's Iron and Steel Industry

Java's Volatile Oil Industry

Repairing the Yellow River Break

Gold Ore Deposits of the Linglungshan Region, Tsaoyuen, Shantung—2

FAR EASTERN MOTORS

Vol. XIX July, 1923 No. 7

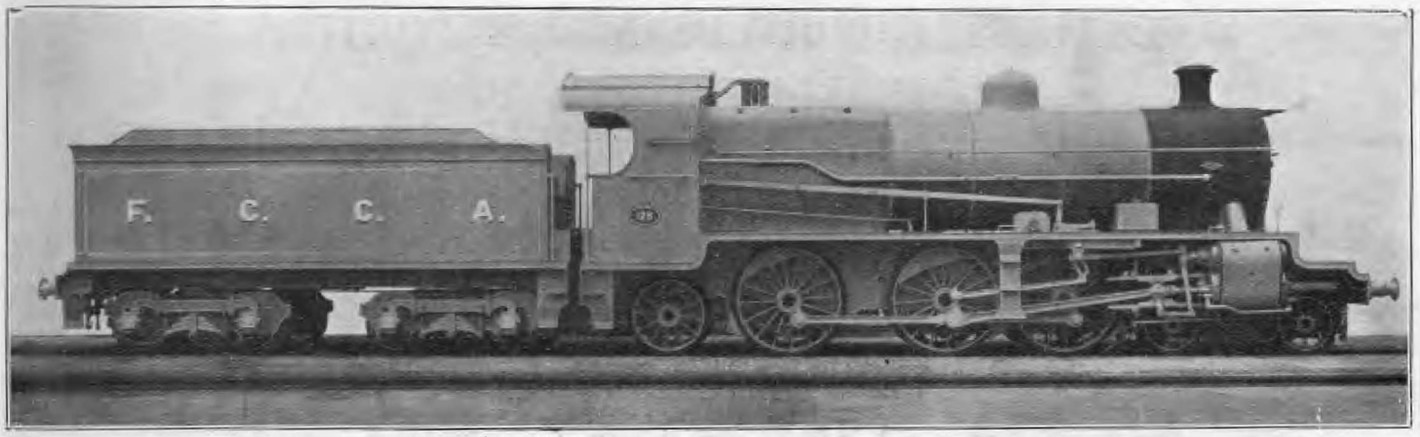
CHIEF

ASSOCIATED BRITISH LOCOMOTIVE MANUFACTURERS FOR CHINA

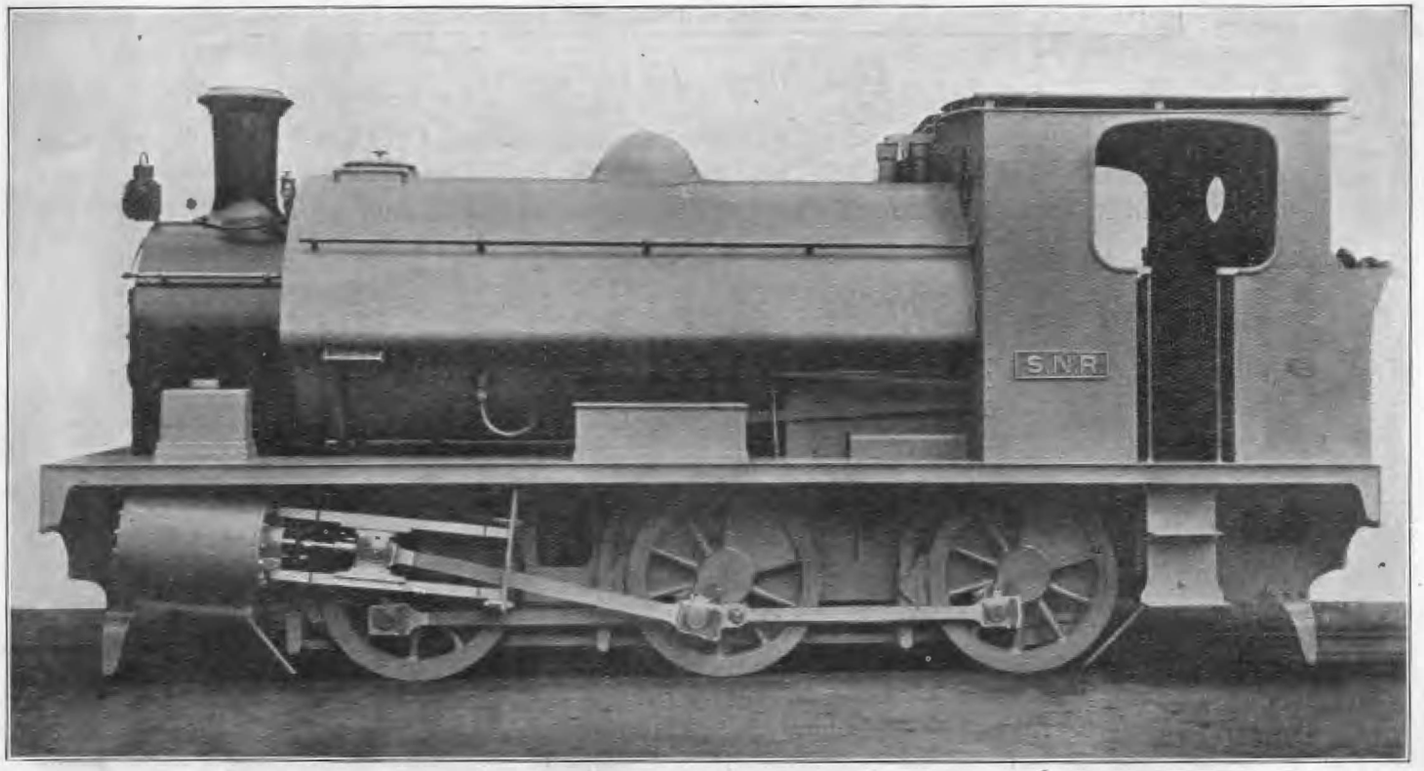
Head Office:
7 HOBART PLACE
GROSVENOR GARDENS
LONDON

TEL. ADDRESS: REBRITMAN, PEKING

Agents in China:
REPRESENTATION FOR
BRITISH MANUFACTURERS LTD.
46 WAI CHIAO PU CHIEH
PEKING



ANDREW BARCLAY SONS & CO., LTD.
THE AVONSIDE ENGINE CO., LTD.
W. G. BAGNALL LTD.
BEYER PEACOCK & CO., LTD.
HAWTHORN LESLIE & CO., LTD.
HUDSWELL CLARKE & CO., LTD.
THE HUNSLET ENGINE CO., LTD.
KITSON & CO., LTD.
NASMYTH WILSON & CO., LTD.
THE NORTH BRITISH LOCOMOTIVE CO., LTD.
ROBERT STEPHENSON & CO., LTD.
THE VULCAN FOUNDRY, LTD.
THE YORKSHIRE ENGINE CO., LTD.



AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

Turkestan — page 539
(& map)

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

SHALL WE TRUST JAPAN?

RAILWAY ELECTRIFICATION IN JAPAN

IRRIGATION IN INDO-CHINA

HYDRO-ELECTRIC DEVELOPMENTS IN N.E.I.

PENANG HILLS RAILWAY

NORTH BORNEO

CONSERVANCY WORK IN NORTH CHINA

上海仁記路第五號

遠東時報

Vol. XIX August, 1923 No. 8

SHANGHAI, PEKING, TOKYO AND MANILA

F. CHIERI 1923

The Racial Issue

Chinese Defiance of American Immigration Laws Threatens to Overshadow the Japanese Problem

TWO days after the Chinese smuggling schooner *Mary Beatrice* was towed into New York with all the marks of a battle royal around her blood-stained decks, Secretary of Labor Davis announced in Washington that over 5,000 Chinese were illegally in New York alone, while Chinese compradores in the know admitted that the total was nearer 10,000. What would have happened had this same number of Japanese laborers evaded our immigration laws and slipped into the Pacific coast states, is better left to the imagination. By this time, America or at least California would have declared hostilities and the war of the races would now be on. The Chinese, as our pet philanthropic recreation, are permitted to do things which we would never tolerate from other peoples. However, the test is coming and more rapidly than people at home imagine.

In the February number of THE FAR EASTERN REVIEW we invited attention to the shifting of the Asiatic problem from the Pacific coast to the Gulf and Atlantic states, reverting to its original anti-Chinese character. At that time it was estimated that over 25,000 Chinese coolies in Cuba, Jamaica, and the Bahamas were patiently waiting their turn to be smuggled across to the promised land at $500 per head. The Gulf states, the first to feel the effects of the new invasion, were even then up in arms and the revenue and immigration services hard pressed to enforce the law.

In addition to this method of flouting our immigration laws, thousands of Chinese are pouring into New York through the loop-hole provided by a federal court ruling holding that Chinese seamen are entitled to shore leave without the $500 bond formerly imposed. Despite all precautions on the part of the authorities, nearly 6,000 Chinese seamen have deserted while on shore leave scattering into the interior where it is difficult to locate them. The situation became so intolerable that the federal authorities were forced to act and on June 7 made their first raid. Within an hour over fifty Chinese laborers illegally in the country were rounded up in Long Island City while scores of others have since been captured in other metropolitan districts.

This is only the commencement of a problem which is certain to develop into an issue that will have a far-reaching effect upon the relations between America and China. Coolie smuggling is fast assuming even greater proportions than ocean bootlegging. Free-booters are building up a traffic in immigrants in defiance of the legal quota, more profitable even than rum-running. It would take the entire American army to run down the Chinese seamen who violate their shore privileges and a formidable auxiliary have to stop the profitable smuggling of Asiatics by means of fast motor-boats from Mexico, Cuba and other Caribbean islands.

"The total number of Chinese illegally residing in the United States, says Secretary Davis, "can only be ascertained by actual enrollment. To deport those actually in New York Davis would cost over $1,000,000." If such an estimate is correct, then the cost of repatriating the other tens of thousands of Chinese who have seeped into the interior, and whose number can only be roughly estimated, may well ascend to over $10,000,000. President Harding has announced that he will ask the next congress for stringent action to prevent the illegal entry of aliens.

The story of the *Mary Beatrice* brought home to the people of New York the story that is old in the Gulf state ports, and still older on the Pacific coast, where any time these past forty years government officials have been busy trailing a mosquito fleet engaged in bringing in Chinese from lower California at $350 to $800 a head. One ring alone working from Ensenada, Mexico, says a writer in the *New York Times*, is credited with having smuggled into the United States 1,000 coolies a month for several years. The Chinese coolie stoically take chances to get into the forbidden land that white men do not often risk and the stories of these expeditions read like old-time dime novels. These smugglers stop at nothing. If hard pressed they will callously sacrifice their human freight or convoy as the case may be, in order to escape capture.

Yet the Chinese keep coming, undeterred by the hardships and the possibility of losing their lives or of being turned back if caught. No coolie has the cash to pay the high charges exacted by the smuggling gangs. The logical deduction is that he is financed by some central organization which profits from this influx of Chinese labor into America. It is safe to deduce that this organization is exclusively Chinese, the ringleaders of which are to be found in the United States with agents in China, chiefly in Hongkong, Canton or Amoy.

The Chinese have carried with them to America that supreme contempt they hold towards the western conception of law and order. It may be true that the individual Chinese is meek, willing and orderly, but these virtues do not exist amongst their society leaders, who are above American law, discipline and punishment. American hostility to the Japanese arises in part from the difficulty of assimilation and because they retain allegiance to their country. We are prone to overlook in the midst of the avalanche of sentimental propaganda that the Chinese also retain their allegiance to their customs and reject the right of American law to interfere in their internal affairs. The Chinese laborer in America recognizes only the laws of his *tong* or society rendering it that allegiance and tribute in assessments withheld from the proper authorities. The Chinatown *tong* wars of New York, San Francisco and other large American cities are beyond the power of the police furnishing ample evidence of a state of affairs which emphasizes the above statement. If further evidence be required it is found in the following New York news item of May 23 ulto. :—

"The treaty between the Hip Sing and Ong Leong *tongs* to keep the peace of Chinatown has reappeared as strangely as it vanished late last summer. Dr. Carleton Simon, special deputy police commissioner in charge of the narcotic division, turned it over to representatives of the two *tongs* at police headquarters, but refused to say how he had got it. Edward Gong, secretary of the Hip Sings, and Henry Moy, secretary of the Ong Leongs, received it and said they would keep it in the offices of the Chinese merchants' association, where it will remain as a guarantee of peace.

"Elaborate ceremonies attended the return of the document. Ten representatives of the New York Chinese were present. Major-General G. P. Wang, chief inspector of police of Kiangsu province, with headquarters at Nanking, China, was a guest of honor. He urged the Chinese to obey our laws and avoid the traffic in drugs and gambling.

"The treaty was signed eleven years ago. Under it, peace reigned among the Chinese in America until last August, when the treaty disappeared, coincident with the assassination of Dr. Ko Law, president of the Hip Sings. Threats of trouble have been heard since the murder."

Here we have the evidence of the existence of a government within a government, in which assassination and intimidation is employed to settle their inter-society quarrels. The smuggling of narcotics into America is largely controlled by these societies and it is also known that the same gangs are financing the coolie trade in defiance of our laws. Secretary Davis says it would cost a million to deport the Chinese illegally in New York, and when we add to this the sums required to deport those scattered throughout the country and the cost of an efficient immigration service, the tax on the American treasury would wipe out any surplus in the profits we receive from Chinese trade after deducting our contributions for philanthropic uplift. At present, it would seem that the net result to our national economy is written in red ink. If our government should elect to employ the Boxer indemnity as a fund to enforce our immigration laws instead of applying it for further uplift work in China, it would meet with considerable applause from the tax payers.

The present trend of Asiatic immigration must be taken as a reflection of the unstable conditions prevailing in China that are forcing thousands overseas to gain the living denied them in their own country. The Chinese are slowly seeping into and establishing colonies in all countries open to their entrance. An Associated Press dispatch from Papeete, Tahiti, dated May 1, announcing the opening of a new Chinese bank described the tremendous strides the Chinese have made in the past ten years in capturing the trade of these islands.

"Steadily every industry is passing into their hands—vanilla curing, market gardening, butchering, pearl shell and pearl buying. They are strong in all lines of merchandising, and now have turned their attention to financing their activities through their own banks.

"The history of the Chinese in Tahiti is an illustration of oriental infiltration where there are no laws to limit or prevent it. The French government, owing to a treaty with China, vital to the interests of the great

French colony to Indo-China, places practically no restrictions on incoming Chinese in Tahiti.

"Originally, Chinese immigrants were brought here as indentured laborers about the time of the American civil war, when a large and flourishing cotton plantation was being operated by English interests. When the price of cotton fell with the close of the war, in 1865, the plantation was abandoned and the majority of the Chinese coolies were returned to their country.

"A few, however, remained, entered business in a small way and gradually, by adapting their methods to those of the natives, obtained a grip on trade. This grip they have strengthened until to-day the European traders view the future with pessimism. Some go as far as to predict that within five years all the commerce of the islands will be in the hands of the Chinese."

The story of Tahiti is the story of all other small countries where the Chinese have gone in large numbers. The world, however, clamors more and more for cheap labor and where the demand is, it is met by China. The problem in the United States is fast developing into one which will overshadow the controversy with Japan, with no prospect of settlement through usual diplomatic procedure. Japan, at least, can exercise some control over her emigration, but in the absence of all authority in China it will be difficult to enter into any agreement with this country relieving the American treasury of the enormous cost of enforcing our laws. At the present rate of development, it will not be many years before the Chinese question will supersede that precipitated by the Japanese in California, and as the years roll on without any solution, the racial issue will once more take precedence over all others. As long as America and Europe stands by and permits Russia to monopolize the waste lands of Asia, forcing the yellow man over the Pacific for his existence, the problem will grow, and the time will come when, to consolidate Russia's hold on vast territories stolen from the Mongolian race, the white races of the Pacific will have to face the issue that should be settled on the plains of Central Asia.

* * *

America's Supremacy in Rubber Manufacture

BECAUSE of certain advantages which it will be hard to overcome, England may remain the largest producer of crude rubber for a long time to come, but America is emphasizing daily her prominence in the field of rubber manufacture.

In the rubber world, one group of scientific men is being watched with the greatest interest. For a number of years this group has been making announcements of important new discoveries with a regularity that has centered the attention of the whole industry upon it. This group makes up what is known as the development department of the United Stated Rubber Company and it is responsible for the development of three new processes which mean more to the rubber manufacturer and to the user of rubber products than anything that has been accomplished in the rubber industry since vulcanization was discovered in 1839.

The three new developments are: (1) Sprayed rubber, for use in the manufacture of all rubber products; (2) Web cord, a fundamental improvement in the art of cord tire making; and (3) a new method of building and vulcanizing cord tires.

Sprayed rubber is produced by a revolutionary new method which eliminates that great bugbear of rubber manufacture, lack of uniformity. Hitherto each rubber grower has transformed his liquid rubber into blocks and sheets by a process of coagulation which called for pouring acids into the liquid rubber or by drying it in smoke.

Needless to say rubber when it reached the factories from the great number of individual plantations was anything but uniform in quality, and there was of necessity a good deal of haphazard work about turning it into useful articles. This lack of uniformity in the raw rubber accounts in part for the fact, so well known to motorists, that one tire would give a phenomenal mileage, while another in the same set, made at the same time, would fall far short of making a satisfactory record. Both went through exactly the same manufacturing process but the lack of uniformity of the raw rubber was partly responsible for the widely varying performances.

Under the acid method of coagulation, which is in general use on the plantations in the Far East where more than eighty per cent. of the rubber comes from, such a small thing as a rainy day might produce a big difference in the quality of the rubber produced. Rain falling into the cups set to catch the rubber as it flowed from the trees would dilute the liquid rubber, and account had to be taken of this dilution when the liquid rubber was put through the coagulation process.

Under the spray process, it makes no difference whether the liquid rubber has been diluted or not. This process extracts from the liquid rubber—latex, as it is called in rubber circles—every atom of rubber. If the latex is rich and full of rubber, the spray process extracts it all. But if the latex is diluted and "thin," the spray process is just as effective and takes out every particle of rubber the liquid contains.

Another very important feature of spray rubber is that it is absolutely pure and of full strength. Rubber coagulated by the smoke process is produced chiefly in the "wild rubber" areas in South America. The workers are natives, unused to the careful, scientific methods required in high-grade manufacture and smoked rubber is frequently filled with impurities such as dirt, sticks and leaves. Acid-treated rubber, as produced on the plantations, has sacrificed some of its strength through contact with the acids and through the manipulation through which it passed before it reached the market. Sprayed rubber is absolutely pure and possesses all the strength of the virgin rubber. Scientific tests show it to have a tensile strength never before equalled by any commercial rubber.

Sprayed rubber may be produced on the plantations and shipped to the United States in blocks or any desirable form, or the latex may be shipped to that country in the tanks of ships and converted into blocks there. Units for making sprayed rubber are in operation by the United States Rubber Company both in America and on the company's large plantations in Sumatra.

While of importance to manufacturers of all kinds of rubber goods, the development of this type of rubber is especially important to tire manufacture, insuring a toughness and uniformity in tread stock and other rubber parts of a tire never before known.

Web cord is the name of a wonderful new cord fabric for tires in which each individual cord has been immersed in rubber latex until it is literally impregnated. Every motorist knows by now that the length of life of his tires depends largely upon the thoroughness with which each cord in the carcass is impregnated and surrounded by rubber, the object of this being to reduce friction.

In making Web cord, the cords are given a latex bath. Cotton absorbs rubber in this new liquid form quickly, so that by the time the bath is completed each cord and every thread in each cord has been saturated with liquid rubber.

As the cords come out of the bath they lie side by side, and the natural adhesiveness of this virgin rubber causes them to stick together. By the time they have dried they form a firm sheet. There are no cross threads whatever, this feature and the thorough rubberization of the cords constituting the essential points of difference between Web Cord and the cord fabric heretofore in use. It is from the fact that there is no cross weave that the fabric gets its name of "Web Cord." Actual use of tire thus made conclusively shows that this fabric makes the strongest and longest wearing tires yet produced.

The essential feature of this process is, of course, that the cords are given a bath in pure latex. This method of treatment should not be confused with the old method of dipping in rubber solution. One of the oldest methods of making tire fabric has been to dip the fabric into a rubber solution made by dissolving crude rubber in benzine or some similar solvent. This old method was not only crude and ineffective, but devitalized the cotton by dissolving out some of the natural oils and waxes.

The third development—a new method of building and vulcanizing cord tires—has a wide significance in tire manufacture, where it displaces the old "cord" method of tire building.

To the tire user it means that the structure of the carcass of the tire is brought very much nearer to perfection than ever before, and that many of the causes of tire break-down have been eliminated.

The new process is called the "flat-band" process of tire building, the name being derived from the fact that under this method tires are built flat and then fashioned into normal tire shape by special machinery, instead of being built to tire shape around a metal core.

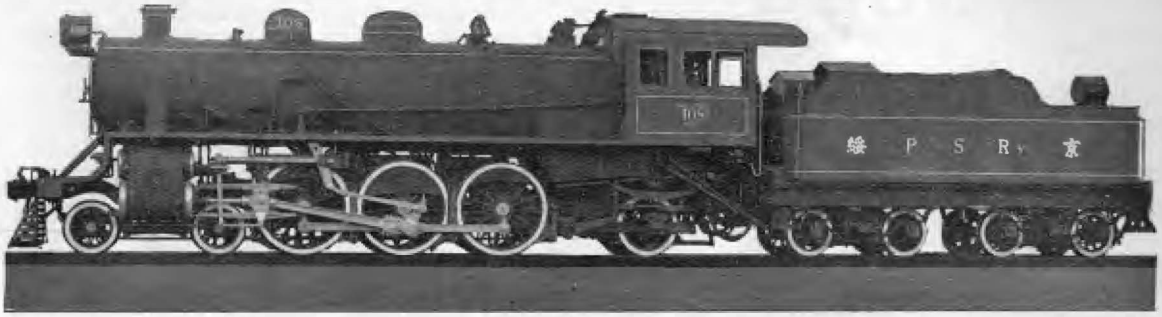
The result of the use of the new process is a uniform tire, equalized throughout in resiliency and resistance to wear, in which each cord contributes always its full strength.

Under the old process the human element played an important part in cord tire construction, and there was always the likelihood that in stretching cord fabric around a core by hand there would be a variation in the tension or a departure from the correct direction of the cords. The tension and the direction of the cords are now determined by a machine that makes no mistakes and these two serious opportunities for tires being faulty are eliminated.

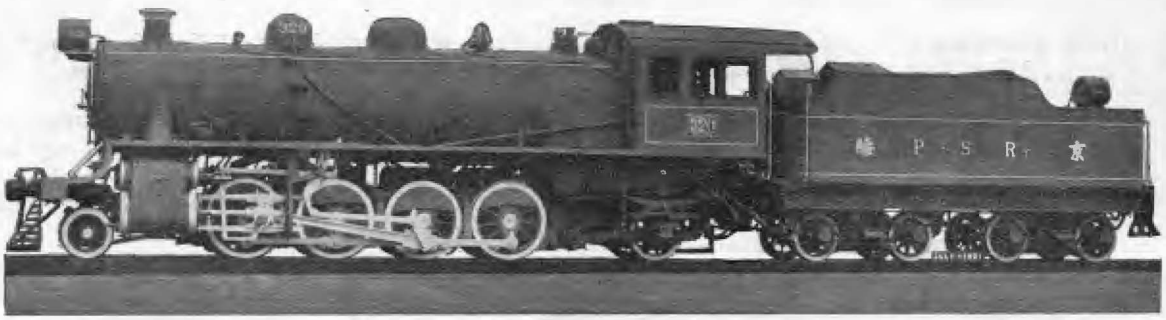
"AMERICAN" LOCOMOTIVES

ON THE

PEKING-SUIYUAN RAILWAY



Total Weight of Engine, 184,500 pounds; Weight on Driving Wheels, 109,500 pounds; Diameter of Driving Wheels, 62 inches; Boiler Pressure, 180 pounds; Cylinders, 20 by 26 inches; Maximum Tractive Power, 25,650 pounds.



Total Weight of Engine, 188,500 pounds; Weight on Driving Wheels, 137,000 pounds; Diameter of Driving Wheels, 50 inches; Boiler Pressure, 180 pounds; Cylinders, 20 by 28 inches; Maximum Tractive Power, 34,300 pounds.

Total Weight of Engine, 446,000 pounds; Weight on Driving Wheels, 388,500 pounds; Diameter of Driving Wheels, 50 inches; Boiler Pressure, 220 pounds; Cylinders, 24 & 38 by 28 inches; Maximum Tractive Power, Compound, 92,500 pounds; Maximum Tractive Power, Simple, 110,000 pounds.

Safety, excellent quality of materials, correct design, good appearance, and perfect workmanship are the features back of "American" locomotives.

These features, coupled with the fact that we have built over 65,000 locomotives should have the earnest consideration of those contemplating the purchase of locomotives.

For further information write to our nearest representative:

AMERICAN LOCOMOTIVE SALES CORPORATION

NEW YORK CITY

Telegraphic Addresses:

Locomotive: Peking, China
Mitsui: Tokio, Japan
Banco: Sydney, Australia
Nottac: Manila, P. I.
Dilpax: Honolulu, Hawaii

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

上海仁記路第五號

遠東時報

The New Trend of Asiatic Politics

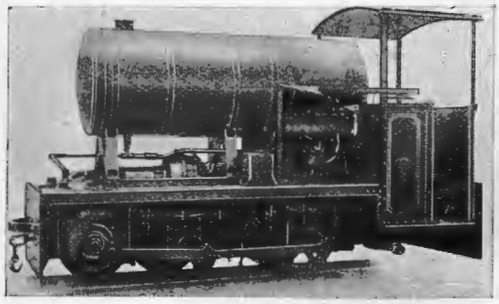
The Japanese Naval Program
The Significance of Singapore
Japan Holds the Balance of Power
The Paramount American Interest in China
America, An Eleemosynary Institution
Education, the Only Hope for China
America's Lost Opportunity in the Philippines
Story of the Philippine National Bank;
An Orgy of Mismanagement
The China Society

Malayan Waterworks
China's Cotton Industry—2
Mines of Indo-China

E. CHIERI

Vol. XIX | September, 1923 | No. 9

A.L. TAYLER.

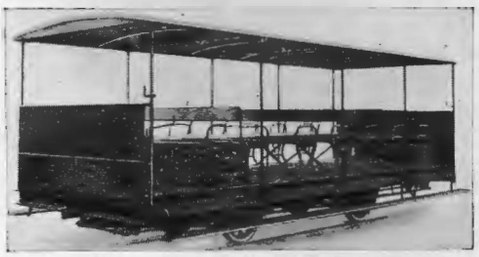


Contractors to: The Admiralty, The War Office, The India Office, The Crown Agents for the Colonies, Colonial and Foreign Governments

Internal Combustion Rail Cars, Inspection Cars, Coaches, Tramcars, Trailers, Locomotives, Tractors, etc.

British built throughout and supplied to upwards of 200 Railways in all Parts of the World
Designs to meet individual requirements

Passenger Freight Shunting | Mining Harbours Docks | Plantations Logging Contractors



The Drewry Car Co., Ltd.

(and McEwan Pratt & Co., Ltd.)
13 South Place, London, E.C.2
Telegrams: "Effervesce, London"
Works: Burton-on-Trent, England

SUPERHEATERS

ELESCO

STEAM SUPERHEATERS for Locomotive, Industrial and Marine Service
Feed Water Heater Equipment for Locomotives
Boiler Feed Pumps Pipe Coils
Designing Engineers and Manufacturers

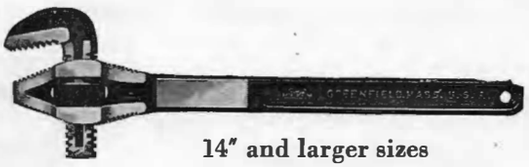
THE SUPERHEATER COMPANY

General Offices: 17 East 42nd St., New York, U.S.A.

Little Giant—The New Pipe Wrench

"THE WRENCH WITH THE ORANGE HANDLE"

8" and 10" sizes



14" and larger sizes

A new design which gives increased strength, increased simplicity, increased usefulness, *less* weight, and fewer parts.
The "*Little Giant*" Pipe Wrench has become popular at once because of the end opening jaws. It can be thrust straight on a pipe like a pair of pliers, and will be found useful in places which are beyond the reach of an ordinary pipe wrench.

The arrangement of the jaw, which can be engaged at will with 2 or 4 sets of teeth on the handle can be seen in the picture. These extra sets of teeth mean long life. The "*Little Giant*" Wrench is drop-forged and heat-treated throughout.
Merchants will be particularly interested in the light weight (less than an ordinary pipe wrench) and the few parts. The "*Little Giant*" has only 3 parts, which means a smaller investment in replacements. Any of our representatives will be glad to quote prices.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

Canadian Plant: Greenfield Tap & Die Corporation of Canada, Limited, Galt, Ontario.
Cable address: "Getede"
REPRESENTATIVES:

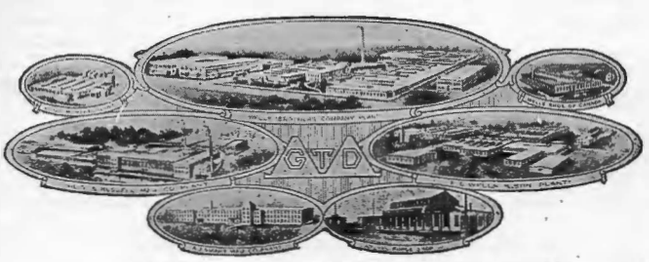
JAPAN.

MULLER, PHIPPS & SELLERS, LTD.
17 Itachibori Kitadori 5-chome, Nishi-Ku
Osaka, Japan
Fudo Bank Bldg., 9.2-chome
Honkokucho, Nihonbashiku
Tokyo, Japan

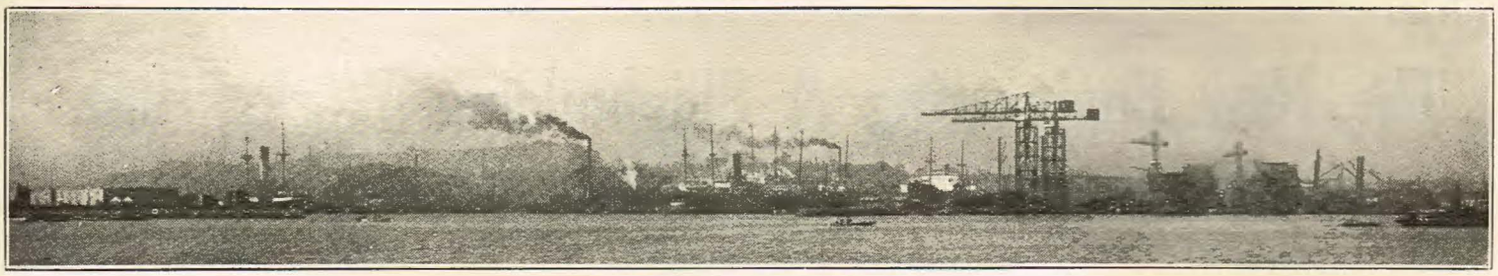
HORNE COMPANY LTD.
6-7 Takayama-cho
Kyobashi-Ku
Tokyo, Japan

CHINA.

MULLER & PHIPPS (CHINA) LTD.
5 Ice House St.
P. O. Box 25, Prince's Bldg., Hongkong, China
2 Canton Road
Shanghai, China



Plants of GTD *Corporation, World's Largest Manufacturers of Screw-threading Tools*



View of Yokohama Dock Co., Ltd.

THE YOKOHAMA DOCK COMPANY, LTD.

Dock Owners, Shipbuilders, Repairers, Engineers, Machinists, Boiler Makers and Warehousemen.
Operating Dockyard, Shipbuildingyard and Storage Warehouses at Yokohama, Japan.

Head Office: Nagasumi-cho :: ***Warehouse Office:*** Midori-cho

Builders for
United States Shipping Board,
Japanese Navy,
Nippon Yusen Kaisha,
and other Principal Shipowners

Cable Address:
"DOCK"
Code Used:
A. 1. A.B.C. 4th and 5th, Bentley's

DRY DOCKS:

No. 1	... ...	625′ × 80′ × 28′
No. 2	... ...	380′ × 50′ × 26′
No. 3	... ...	480′ × 63′ × 21½′

SHIPBUILDING BERTHS:

No. 1	... ...	400′ × 27′
No. 2	... ...	490′ × 30′
No. 3	... ...	580′ × 36′
No. 4 } No. 5 }	... ...	680′ × 38′

WAREHOUSES:

	TSUBO.
Iron Building	8,871.57
Concrete Building	1,636.99
Brick Building	2,011.72
Others	5,807.74

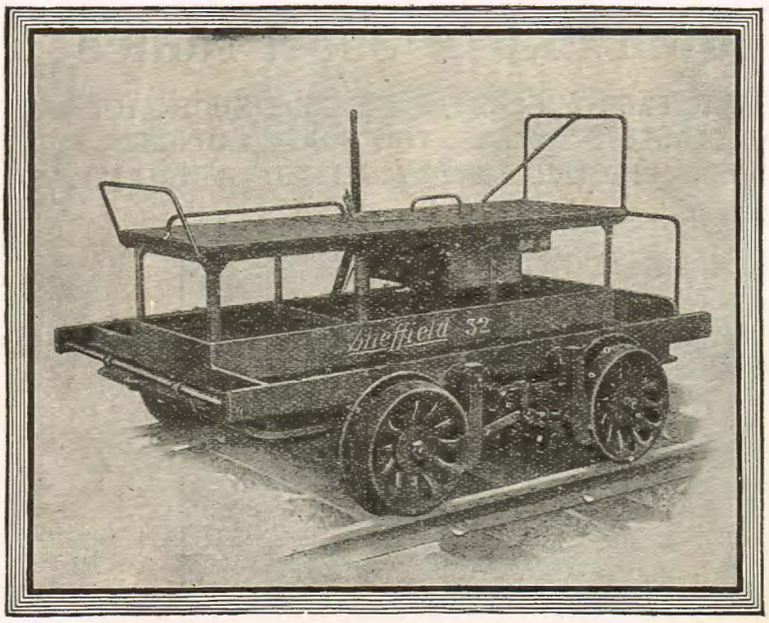
Directors: TOSHINOBU SUDA, Esq. *(Chairman)*, MANKICHI MIYANAGA, Esq. *(Managing Business Dept.)*, TAMATARO TOJO, Esq. *(Managing Shop Dept.)*

Agencies: NIPPON YUSEN KAISHA, London Branch. NIPPON YUSEN KAISHA, New York Branch.

All situated in Yokohama Harbour, the First Port at which Trans-Pacific Steamships arrive, and the Last Port from which they depart.

Complete Facilities for every Work and Fully Equipped up to date for

All Repairing Work. All Engine Work. All New Ship Work. All Boiler Work.



FAIRBANKS-MORSE

Sheffield 32

RAILWAY MOTOR CARS

Thousands of Sheffield 32 Railway Motor Cars are used daily, under all weather conditions—by gangs on railways in all parts of the world—demonstrating the ample power, constant economy and successful performance of this general purpose car.

The engine is horizontal—two-cylinder, air-cooled, without valves, cams or sprockets. Drives direct through rear axle which forms engine crank-shaft.

Engine is mounted on separate sills independent of main frame and is easily demountable. All-steel frame—large body space—pressed steel wheels.

Gangs provided with this car put in their full day at productive work on tracks and roadbeds.

M. S. Vernal, Calcutta
Pacific Commercial Co., Manila
Borneo Co., Ltd., Singapore
Sale & Frazar, Ltd., Tokyo

Fairbanks, Morse & Co.

MANUFACTURERS **INCORPORATED**

Foreign Dept., New York, U.S.A. **London, England** **Buenos Aires, Argentina**

China society of America has recognized the defects in our system and under the able direction of Professor McElroy has initiated a movement that will enable the young Chinese student to supplement his college work with a course of practical training in our industrial establishment. In pursuance of this program several hundred have been successfully placed in manufacturing plants, banks and business offices throughout the country. In the long run this departure should be productive of excellent results. However, it still has its weak points arising from the absence of large American industrial enterprises or commercial firms in China who can give employment to such men on their return. In the keen competition to win China's confidence and trade by benefits, it is hardly to be expected that British, French or Japanese controlled enterprises will open the door of opportunity to Chinese trained in America and favoring American materials. If Americans hope to reap and material gains from the new departure, they must go further and furnish the capital for the creation of American industries or construction of loan built railways that will provide employment for their proteges, or, hope for the best through their employment in purely native enterprises. Notwithstanding the present dark outlook for the development of native resources through the investment of native capital, the new American plan has much to commend it. It is a step in the right direction.

It is especially gratifying to see that the China society has abandoned its former anti-Japanese attitude and is now pursuing a policy calculated to make for peace and harmony in Asia. It is also a matter of congratulation for Americans interested in the Far East to learn that the society is now directed by men of broad vision and experience in handling Asiatic questions, men who command the full confidence and respect of their countrymen of all political beliefs and parties. With the Hon. W. Cameron Forbes as honorary president and Major-General James G. Harbord as president, the China society enjoys a leadership which few national organizations can hope to equal. The record of W. Cameron Forbes as governor-general of the Philippines typifies all that stands for efficiency and probity in public life and the highest ideals of government. A great administrator, big-hearted philanthropist and a statesman of the highest order with a full understanding of the basic problems of the Orient, the honorary president of the society may be expected to exert his great influence for the peaceful and honorable solution of problems which still exist to unsettle conditions and make for unpleasantness in international relations in this part of the world.

As its president, the society has one of the greatest soldiers and executives our country has produced. General Harbord is also president of the Radio Corporation of America with a lively interest in Far Eastern affairs. In addition, the society counts on its board of directors Mr. Edward Marshall one of the most brilliant names in American journalism. The other directors elected at the last annual meeting of the society are Owen Roberts, former president of the society; M. A. Oudin, vice-president of the International General Electric Co.; Charles Haydon, president, Haydon, Stone & Co.; K. C. Li, president, Wah Chang Trading Co.; R. C. Patterson, jr., vice-president of the Peacock Film Corp.; Edward Marshall, of the Edward Marshall International News Syndicate; Mrs. John Allen Dougherty, of Washington, D. C.; Mrs. Simeon Ford, of New York city; A. J. Drexel Biddle, jr., vice-president of China Enterprises, Inc.; Mrs. Thomas Lamont, of New York city; Dr. Frederick Peterson of New York; with Professor Robert M'elroy of Princeton, as managing director.

Six Men Out of a Job

"The next governor-general of the Philippines will be a Filipino."

ON several occasions during the past six months we have been confidentially informed by those close to the native Filipino political leaders that this was the next step on the road to independence. It is hardly necessary to name the aspirant for gubernatorial honors as recent events leave no doubt as to his identity. In order, however, to prepare the ground for these long deferred hopes, a vacancy in Malacanan palace was quite essential and as there appeared to be no immediate prospect that the present tenant would voluntarily seek other quarters, the Filipino politicos set out to facilitate and quicken his departure. Which gives us the background of the conspiracy to create an issue that would either frighten him away or compel his recall.

The appointment of Leonard Wood to the governor-generalship of the Philippines carried with it the mission of salving the wreck after eight years of sentimental democracy directed by native politicians under the leadership of Manual Quezon. This most capable and shrewd *politico* picked General Wood's predecessor for the job and for eight long years dictated his policies. The governor-general's name was Harrison, but the power behind the throne was Quezon, the hero of the independence movement. Four more years of Wilsonian democracy would have firmly consolidated his rule and by this time, the United States would either have a first-class insurrection on its hands or forced to concede absolute independence to the islands with Su Excelentissimo Senor Don Manual L. Quezon holding down the Big Chair in the Ayuntimiento, extending his legs under the mahogany at Malacanan, and receiving the salute of the Filipino army corps on Wallace field.

The Wood-Forbes mission spoiled these well-laid plans. In recommending that "under no circumstances should the United States permit to be established in the Philippine Islands a situation which would leave the United States in a position of responsibility without authority," General Wood incurred the undying enmity of the independence party. Figuratively speaking, since that time Don Manuel has been silently and assiduously grinding and whetting his trusty bolo against the time he could use it on Wood's official neck. After two years of tom-toming, war dancing and working up to the proper frenzy, the agile Filipino finally saw what he thought was a good opening and slashed out with a blow that would have felled a less skilfull antagonist and added his top-piece to the dessicated trophies adorning the head-hunter's fire-place.

This, in brief, is the story wafted to us by the summer typhoons from the palmy isles of the Southern Seas. Quezon has swung his bolo and challenged the governor-general and Washington to the show down which it is hoped will result in hanging a To Let sign on the palace gates of Malacanan. The entire Filipino cabinet has danced to the sound of the war-drum and resigned their jobs in a body to rally around the big cacique. A cablegram has been dispatched to the president demanding Wood's immediate recall. Wood, however, has accepted the six resignations and is standing pat waiting for the next move. President Coolidge has the option of endorsing the governor-general or of recalling him handing over the government to the Filipinos, pulling up stakes and leaving the islands to their fate, in which case, Don Manuel moves in when Wood moves out. Until moving day comes around, however, the much advertised political crisis in the Philippines resolves itself into a very simple economic problem. Six men are out of a job. That is all.

Foreign Supervision Over China's Railways

A Comparison of Chinese and S.M.R. Statistics which Reveal how China's Railways are being Looted

THE Westminster Bank, the Hongkong and Shanghai Banking Corporation, and the Yokohama Specie Bank, as agents for the Industrial Bank of Japan, have issued in London £4 millions 5 per cent. sterling bonds of the South Manchurian Railway Company at 88 per cent. The bonds are repayable at par in 1948, with an option to the Company to redeem the whole or part after 1933. Both principal and interest are unconditionally guaranteed by the imperial Japanese government. The total share capital of the Company is 380 million yen, of which 120 million—about £12 millions sterling—is held by the Japanese government as compensation for guaranteeing that amount of 4½ and 5 per cent. debentures issued here in 1907, 1908, and 1911, and still outstanding. Of these, the 5 per cent. debentures, which are repayable at par in 1932, stand at 94, thus giving a yield of 5⅞ per cent., while the present issue will return anything from that amount up to 6½ per cent., according as it is redeemed late or early. In addition to sterling loans there are internal debentures to a total of 195 million yen. After paying the dividends on these debentures, the profits for the last four years average some 39 million yen, or enough to cover the service of the sterling debentures about five times. Further

figures show that most of the Company's activities are meeting with increasing success each year and in fact the growth has exceeded expectations, with the result that the present loan had to be made to provide capital for new railway and harbour facilities.

The floating of this loan in London is accepted in Chinese official circles as further evidence of the existence of a "gentleman's agreement" between the members of the consortium to recognize Japan's special position in Manchuria in violation of the Washington treaties. In the opinion of this element the Y.20,000,000 loan to the Oriental Development Company by American group bankers was also the outcome of this secret understanding, overlooking that the consortium pact does not cover existing railways or those lines upon which substantial progress has been made. Under no stretch of the imagination can the South Manchuria Railway or its branches be included within the scope of the consortium agreement, any more than those loan-built lines in China proper, which unless all signs fail, will sooner or later be forced into the money markets for new capital for necessary improvements and extensions.

The collapse of China's railway finance coupled with a cynical disregard for maintenance and the terms of loan agreements have almost destroyed the earning power of the properties and eliminated them as security for the service of their construction loans. The pitiable condition of China's railways has precipitated the movement for the employment of a foreign directed police, auditors and traffic managers to safeguard the bondholders and save something from the wreck. As matters stand, it is hopeless for China to expect foreign financial aid in the reconstruction or extension of her transportation system except under such conditions as will provide adequate guarantees that the interests of the bondholders will be protected, and from the present outlook, new construction is out of the question for many years unless existing railway revenues are, set aside for its financing. The one and only hope for an early resumption of railway construction in China lies in the complete severance of the railway board from the other ministries and the application of an independent budget system that will set aside the revenues of existing lines for financing extensions through foreign loans.

When we recall that British and French investors have furnished practically all the funds for the construction of Chinese railways and have seen their security all but ruined by the application of a policy which admits of no intervention for protecting their interests, we can better understand and sympathize with the movement to bring all the lines under more effective control. There is no good reason why China's railways should not contribute a handsome surplus to the national treasury over and above the sums needed for the service of old loans and new construction. The remarkable results arising from efficient management and protection can be seen in a comparison of the Chinese government railway statistics with the results obtained by the Japanese owned and operated South Manchuria system. Remembering that the population of China proper is placed at several hundred per square mile while that of Manchuria is 35 to 40, the following figures compiled from official reports tell their own story.

In the first table will be found a comparison of the mileage of all Chinese government lines with that of the South Manchuria railway over the period 1915-1920. It will be seen that the Chinese system has a total length of 6,042 kilometres or nearly six times the length of the Manchurian lines of 1,106 km. With this handicap, (Table 2) the South Manchuria Railway enjoys a revenue per kilometer of $77,140 (silver Yuan) against $15,689 for the Chinese system. With one-sixth the mileage the Japanese operated lines benefit in revenues five times the amount collected by China. In Table 3, we find that the Japanese line has 30 locomotives per 100 km. with a tractive power (Table 4) of 436 metric tons against 13 locos with a tractive power of 131 metric tons for the Chinese lines. The Japanese line has 30 passenger cars (Table 5) per 100 km. against 23 for the Chinese and 508 freight cars (Table 6) with a capacity of 13,673 metric tons (Table 7) against 203 with a capacity of 5,028 metric tons for the Chinese lines. The average number of paying passengers transported per kilometre by the S. M. R. is 7,344 (Table 8) bringing in a revenue of $12,341 against 5,241 passengers with a revenue of $5,397 for the Chinese system. The average metric tonnage carried by the S. M. R. per km. is 8,329 against 3,693 for the Chinese lines, or an average *total* per km. of 3,017,000 metric tons against 758,000 metric tons for the Chinese system. The average freight receipts per km. for the S. M. R. are $57,476 or about seven times greater than the $8,454 collected by the Chinese lines.

These figures are eloquent and explain why the South Manchuria Railway can raise a loan participated in by the most important British bank in China without difficulty, while the same group of bankers demand exceptional guarantees from China. At the same time, the comparison clearly conveys the reason why other powers decline to intervene or take sides in the never ending political squabbles started by China to drive Japan out of Kwantung and Manchuria. The restoration of the S.M.R. terminus and deep water port to Chinese sovereignty would simply invite the same catastrophe which has befallen all other important foreign investments when placed under Chinese direction. One year of Chinese misgovernment in Kwantung and the railway zone, would wipe out one of the most important civilizing influences in the whole of Asia.

Bearing in mind the great difference in the density of population and industrial development between China proper and the territory served by the S.M.R., it would seem that with efficient honest direction the 6,000 kilometres of Chinese operated state railways could be brought to earn revenues of $462,840,000 per year, the same as the Japanese managed line, instead of the present $94,000,000. The difference of $368,000,000 would pay for all new railway construction, finance the government and create industries without having to call on foreigners for financial assistance. The S.M.R. figures at the best are only an indication of what the future holds out, for as the branches under construction are completed opening up new territory to agriculture and colonization, as northern Manchuria contributes her quota of wheat and flour for export, as the Fushun mines reach their full output and other resources are developed, the revenues of the S.M.R. may be expected to double. Every energy of its management is directed towards this end, and each year it becomes necessary to provide new capital in the form of loans to hasten development. China has a wonderful example in her own territory of what she can expect when her railways, no longer the playthings of politicians and *tuchuns*, are brought under efficient management through an independent railway commission working in harmony with friendly foreign assistance.

COMPARATIVE STATISTICS OF THE CHINESE GOVERNMENT AND SOUTH MANCHURIA RAILWAYS.

Length of Line I. in km. including Branches.

	1915	*1916*	*1917*	*1918*	*1919*	*1920*
Peking-Hankow Railway ...	1,316	1.313	1.313	1.313	1.313	1.321
Peking-Mukden	965	965	975	975	975	975
Tientsin-Pukow	1,107	1.107	1.107	1.107	1.107	1.107
Shanghai-Nanking	327	327	327	327	327	327
Shanghai-Hangchow-Ningpo..	270	286	286	286	286	286
Peking-Suiyuan	429	467	467	495	495	499
Cheng-Tai	243	243	243	243	243	243
Chinghua-Taoku	152	152	152	152	152	152
Pienlo	185	185	185	185	185	185
Kirin-Changchun	130	130	130	130	125	125
Pinghsiang-Chuchow ...	97	97	97	91	91	91
Canton-Kowloon	143	143	143	143	143	143
Canton-Sanshui	49	49	49	49	49	49
Changchow-Amoy	32	28	29	28	28	28
Canton-Hankow	—	—	—	—	423	423
Ssupingkai-Chengchiatun ...	—	—	—	—	88	88
Total	5,445	5,492	5,503	5,524	6,030	6,042
South Manchuria	1,112	1,112	1,112	1,112	1,109	1,106
Gross Receipts per Kilometre Yuen (silver dollar).						
Peking-Hankow Railway ...	13,099	15,653	14,353	18,291	20,343	19,905
Peking-Mukden	15,985	15,745	18,053	22,058	21,211	24,069
Tientsin-Pukow	7,729	9,318	9,589	11,443	12,836	14,701
Shanghai-Nanking	10,529	11,737	12,991	15,003	17,572	21,058
Shanghai-Hangchow-Ningpo..	7,674	6,556	7,965	8,493	9,266	10,636
Peking-Suiyan	8,450	8,407	8,060	9,131	10,083	11,729
Cheng-Tai	8,823	9,074	10,494	13,395	14,111	16,284
Chinghua-Taoku	4,164	5,493	6,158	6,296	6,480	8,007
Pienlo	6,281	7,000	7,503	7,016	9,265	14,141
Kirin-Changchun	7,031	7,208	8,754	13,731	15,336	20,480
Pinghsiang-Chuchow ...	7,113	7,670	6,340	6,121	7,703	6,571
Canton-Kowloon	5,713	5,643	6,594	6,406	6,923	7,280
Canton-Sanshui	17,388	19,653	—	—	—	—
Changchow-Amoy	594	1,679	1,828	1,679	1,000	500
Canton-Hankow	—	—	—	—	468	378
Ssupingkai-Chengchiatun ...	—	—	—	—	3,580	9,250
Average	10,577	11,568	11,807	14,276	14,140	15,689
South Manchuria Railway ...	21,487	25,013	30,987	40,461	60,470	77,140
Number of Locomotives per 100 km.						
Peking-Hankow Railway ...	10	10	11	11	11	12
Peking-Mukden	15	16	16	16	17	18
Tientsin-Pukow	9	8	8	8	9	11
Shanghai-Nanking	11	11	11	11	11	13
Shanghai-Hangchow-Ningpo..	13	13	13	13	13	13
Peking-Suiyuan	14	13	14	14	14	16
Cheng-Tai	23	23	23	23	23	23
Chinghua-Taoku	7	7	7	7	8	8

	1915	1916	1917	1918	1919	1920
Pienlo	8	8	8	8	8	8
Kirin-Chengchun	10	10	10	10	14	14
Pinghsiang-Chuchow ...	12	12	12	13	13	13
Canton-Kowloon	10	10	10	10	10	10
Canton-Sanshui	20	8	—	—	—	—
Changchow-Amoy	6	8	7	7	7	7
Canton-Hankow	—	—	—	—	5	8
Ssupingkai-Chengchiatun ...	—	—	—	—	6	6
Average	12	12	12	12	12	13
South Manchuria Railway ...	24	24	24	26	30	30

Traction Power of a Locomotive per 100 km. (metric ton).

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	86	86	99	98	98	117
Peking-Mukden	126	136	137	139	161	174
Tientsin-Pukow	87	87	87	87	101	144
Shanghai-Nanking	94	94	94	94	94	110
Shanghai-Hangchow-Ningpo..	122	114	114	114	114	114
Peking-Suiyuan	179	169	189	191	191	206
Cheng-Tai	123	123	123	123	123	123
Chinghua-Taoku	57	45	57	57	71	71
Pienlo	64	64	64	64	56	56
Kirin-Changchun	86	86	61	83	128	128
Pinghsiang-Chuchow ...	96	96	96	101	101	101
Canton-Kowloon	82	82	81	81	81	81
Canton-Sanshui	116	117	—	—	—	—
Changchow-Amoy	34	38	38	38	38	21
Canton-Hankow	—	—	—	—	63	97
Ssupingkai-Chengchiatun ...	—	—	—	—	13	68
Average	103	104	109	110	112	131
South Manchuria Railway ...	302	205	305	338	411	435

Number of Passenger-Cars per 100 km.

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	14	18	14	17	20	21
Peking-Mukden	35	35	36	30	29	31
Tientsin-Pukow	20	20	20	18	18	18
Shanghai-Nanking	31	31	31	31	31	31
Shanghai-Hangchow-Ningpo..	42	40	43	44	44	48
Peking-Suiyuan	19	17	17	19	19	20
Cheng-Tai	20	21	21	21	21	21
Chinghua-Taoku	18	15	14	12	12	12
Pienlo	19	19	21	26	26	31
Kirin-Changchun	20	20	19	13	14	14
Pinghsiang-Chuchow ...	16	17	17	18	18	24
Canton-Kowloon	31	31	29	29	29	29
Canton-Sanshui	85	86	—	—	—	—
Changchow-Amoy	18	21	25	25	25	25
ffanson-Hankow	—	—	—	—	12	11
Ssupingkai-Chengchiatun ...	—	—	—	—	13	14
Average	23	24	24	23	22	23
South Manchuria Railway ...	19	20	21	23	27	30

Number of Freight—Cars per 100 km.

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	204	200	201	203	201	251
Peking-Mukden	244	344	345	350	345	386
Tientsin-Pukow	119	119	123	126	117	117
Shanghai-Nanking	134	133	133	134	134	134
Shanghai-Hangchow-Ningpo	195	180	177	177	176	168
Peking-Suiyuan	200	185	186	172	172	177
Cheng-Tai	258	258	258	258	258	258
Chinghua-Taoku	105	108	111	123	134	215
Pienlo	119	119	112	108	111	105
Kirin-Changchun	178	178	176	182	182	182
Pinghsiang-Chuchow ...	190	190	190	208	208	198
Canton-Kowloon	44	45	47	47	47	47
Canton-Sanshui	41	41	—	—	—	—
Changchow-Amoy	31	36	32	32	32	41
Canton-Hankow	—	—	—	—	85	85
Ssupingkai-Chengchiatun ...	—	—	—	[illegible]	[illegible]	32
Average	190	193	[illegible]	[illegible]	[illegible]	[illegible]
South Manchuria Railway ...	286	286	308	377	433	508

Capacity of Freight-Car metric ton.

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	4,254	4,255	4,269	4,270	4,259	6,377
Peking-Mukden	7,482	7,365	7,423	7,389	8,876	9,319
Tientsin-Pukow	2,841	2,853	2,988	3,016	2,850	2,845
Shanghai-Nanking	3,400	3,328	3,306	3,320	3,330	3,326
Shanghai-Hangchow-Ningpo .	5,653	5,133	5,052	5,040	4,949	4,720
Peking-Suiyuan	5,760	5,203	5,228	4,840	4,837	4,869
Cheng-Tai	5,190	5,272	5,272	5,272	5,272	5,276
Chinghua-Taoku	2,983	3,028	3,113	3,507	3,802	6,898
Pienlo	2,389	2,389	1,697	2,163	2,227	2,108
Kirin-Changchun	3,832	3,772	3,699	3,699	3,799	3,799
Pinghsiang-Chuchow ...	3,822	3,762	3,762	4,037	4,037	3,961
Canton-Kowloon	1,017	1,042	1,085	1,085	1,085	938
Canton-Sanshi	1,122	1,103	—	—	—	—
Changchow-Amoy	631	714	642	642	642	642
Canton-Hankow	—	—	—	—	2,053	2,048
Ssupingkai-Chengchiatun ...	—	—	—	—	712	867
Average	4,468	4,389	4,399	4,440	4,434	5,028
South Manchuria Railway ...	7,806	7,839	8,351	10,175	11,639	13,673

Average Number of Persons Transported per km.

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	2,075	2,374	2,574	2,751	3,072	3,036
Peking-Mukden	3,557	3,625	3,896	3,667	3,603	5,204
Tientsin-Pukow	2,148	2,481	1,974	2,211	2,344	2,900
Shanghai-Nanking	16,632	17,494	17,687	19,563	21,778	25,054
Shanghai-Hangchow-Ningpo..	15,511	14,380	16,316	17,730	18,987	20,054
Peking-Suiyuan	1,634	1,747	1,989	1,748	2,350	2,198
Cheng-Tai	1,017	977	1,047	1,126	1,297	1,487
Chinghua-Taoku	1,429	761	1 407	1 562	1 800	2,068
Pienlo	2,814	3,046	3,020	3,204	4,101	5,282
Kirin-Changchun	2,058	2,071	2,914	3,003	2,520	3,822
Pinghsiang-Chuchow ...	3,601	3,913	3,357	1,422	3,671	3,776
Canton-Kowloon	15,397	14,405	14,321	12,305	12,973	13,554
Canton-Sanchui	85,207	133,157	—	—	—	—
Changchow-Amoy	—	7,382	7,226	4,234	—	720
Canton-Hankow	—	—	—	—	1,752	—
Ssupingkai-Chengchiatun ...	—	—	—	—	896	2,162
Average	4,811	5,531	4,663	2,825	4,674	5,241
South Manchuria Railway ...	3,335	3,966	5,256	6,737	8,362	7,344

Average Passenger Receipts per km. Tickets Receipts only.
Yuen (silver dollar)

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	2,958	3,334	3,369	4,036	4,903	5,585
Peking-Mukden	5,629	6,128	8,721	7,833	7,600	10,375
Tientsin-Pukow	2,989	3,488	3,766	4,498	4,977	5,728
Shanghai-Nanking	7,166	7,747	8,185	8,700	9,911	11,338
Shanghai-Hangchow-Ningpo.	4,702	4,386	5,102	5,508	5,900	6,752
Peking-Suiyuan	1,836	1,820	1,852	1,748	2,341	2,494
Cheng-Tai	1,782	1,831	1,835	2,097	2,323	2,635
Chinghua-Taoku	703	804	845	891	1,124	1,223
Pienlo	2,943	3,074	2,924	3,009	3,921	4,723
Kirin-Changchun	2,574	2,638	2,911	4,141	4,468	5,388
Pinghsiang-Chuchow ...	1,146	1,187	684	528	1,302	1,316
Canton-Kowloon	4,754	4,542	3,735	5,168	5,809	6,202
Canton-Sanshui	16,530	18,184	—	—	—	—
Changchow-Amoy	—	1,483	1,700	803	—	77
Canton-Hankow	—	—	—	—	919	1,227
Ssupingkai-Chengchiatun ...	—	—	—	—	1,112	2,706
Average	3,705	3,998	4,209	4,703	4,782	5,397
South Manchuria Railway ...	4,085	5,034	6,813	9,788	11,879	12,341

Average Metric Tonnage Transported per km. metric ton.

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	2,705	2,669	2,746	2,992	3,627	3,509
Peking-Mukden	5,629	5,164	5,545	6,169	6,805	7,207
Tientsin-Pukow	1,826	1,940	1,792	2,217	2,404	2,615
Shanghai-Nanking	2,568	2,740	2,973	3,458	4,134	4,275
Shanghai-Hangchow-Ningpo.	1,733	1,276	1,621	1,623	1,728	2,043
Peking-Suiyuan	2,465	3,901	2,363	2,625	2,785	2,995
Cheng-Tai	2,560	3,290	3,491	4,656	4,771	4,983
Chinghua-Taoku	3,726	5,477	6,439	6,133	6,116	5,906
Pienlo	1,493	2,119	2,537	2,127	2,658	2,588
Kirin-Changchun	2,979	2,983	2,408	3,513	3,905	5,196
Pinghsiang-Chuchow ...	6,499	6,828	5,618	4,183	6,405	4,838
Canton-Kowloon	438	547	688	663	564	555
Canton-Sanshui	179	420	—	—	—	—
Changchow-Amoy	—	69	90	197	76	35
Canton-Hankow	—	—	—	—	2,740	2,881
Ssupingkai-Chengchiatun ...	—	—	—	—	1,218	2,786
Average	2,941	3,033	3,069	3,353	3,547	3,693
South Manchuria Railway ...	4,781	5,083	5,933	6,799	8,260	8,329

Average Total Metric Tonnage per km. 1000 metric tons.

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	515	634	576	832	943	1,049
Peking-Mukden	744	678	825	933	1,031	1,075
Tientsin-Pukow	332	489	542	650	703	800
Shanghai-Nanking	523	599	612	773	930	930
Shanghai-Hangchow-Ningpo.	154	120	169	182	204	253
Peking-Suiyuan	236	250	225	270	319	421
Cheng-Tai	1[illegible]1	264	289	369	401	467
Chinghua-Taoku	289	408	437	440	441	440
Pienlo	117	152	162	155	172	195
Kirin-Changchun	166	178	[illegible]	343	[illegible]	316
Pinghsiang-Chuchow ...	[illegible]	[illegible]	527	324	553	[illegible]
Canton-Kowloon	23	31	11	15	[illegible]	[illegible]
Canton-Sanshui	3	4	—	—	—	—
Changchow-Amoy	—	1	2	2	1	15
Canton-Hankow	—	—	—	—	128	144
Ssupingkai-Chengchiatun ...	—	—	—	—	85	183
Average	416	477	502	616	641	758
South Manchuria Railway ...	1,508	1,709	1,982	2,239	2,721	3,017

Average Freight Traffic Receipts per km. Yuen (silver dollar)

	1915	1916	1917	1918	1919	1920
Peking-Hankow Railway ...	9,291	10,663	9,783	12,516	13,863	13,437
Peking-Mukden	9,124	7,948	9,539	11,760	10,605	11,945
Tientsin-Pukow	3,525	4,509	4,518	5,374	5,898	7,141
Shanghai-Nanking	2,501	2,962	3,609	4,627	5,510	5,564
Shanghai-Hangchow-Ningpo.	1,987	1,553	1,927	2,365	2,564	2,965
Peking-Suiyuan	5,619	5,664	5,338	6,289	6,611	8,052
Cheng-Tai	6,414	6,189	7,519	9,775	10,162	11,935
Chinghua-Taoku	3,343	4,526	5,131	5,024	4,949	4,964
Pienlo	3,048	3,730	3,613	2,949	4,255	4,283
Kirin-Changchun	3,961	3,926	4,854	8,573	9,098	10,171
Pinghsiang-Chuchow ...	5,772	6,293	5,223	4,277	6,093	4,838
Canton-Kowloon	518	752	864	913	350	913
Canton-Sanshui	338	834	—	—	—	—
Changchow-Amoy	—	44	49	55	39	46
Canton-Hankow	—	—	—	—	1,448	1,453
Ssupingkai Chengchiatun ...	—	—	—	—	2,062	4,606
Average	6,003	6,331	6,446	7,961	7,839	8,454
South Manchuria Railway ...	15,522	17,880	21,391	27,318	41,754	57,746

cessions. The forest administration would cut the area available into separate lots and lease them by auction for a period of two years. This was quite sufficient time, since labor was then plentiful.

During the period from 1914 to 1917 a cedar log 21 feet long and 17 inches in diameter at the upper end would cost at the mill 5.50 to 6.00 gold roubles, including stump tax, sawing, transportation, etc. Such a log usually yielded 25 cub. feet of sawn timber, making 22 to 24 gold kopecks per cubic foot of sawn timber. Freight from saw-mills to Vladivostok at that time did not exceed 5 to 6 kopecks per cub. foot, thus a cub. foot of timber cost not more than 30 to 33 gold kopecks delivered in Vladivostok, while the market price was 40 to 45 kopecks. This gave a net profit of 10 kopecks per cub. foot. Nobody thought of exporting timber since the Vladivosok Fortress and the Ussuri Railway, as well as the population usually bought up the entire production and only in a few instances were small parcels of timber shipped to Japan and other countries.

The revolution of 1917-21, the civil war, the Japanese military occupation of the whole Ussuri line in 1920-21, the destruction of bridges by partizans and the pilfering of the saw-mills caused great losses to concessionaires, who were compelled to discontinue work and even leave cut logs in rivers. In 1922 all saw-mills were stopped. In addition the exhorbitant railway tariff introduced in 1921 (30 kopecks per cub. foot from Iman to Vladivostok) made the cost of transportation prohibitive.

Such, in general, is the forest position along the zone of the Ussuri Railway. In spite of the enormous reserves only a small part has been exploited. At the same time a fully developed timber industry in the zone of the Ussuri Railway has a great future in store. It is but natural that the timber industry in the Ussuri country will not remain in the same state of stagnation as it is at present. It must and will develop, however, this development follow a carefully worked out plan and the rapacious methods of working hitherto employed definitely abandoned. As is evidenced from the foregoing, the cost of one cubic foot of sawn timber delivered at Vladivostok was about 35 gold kopecks. But this price could have been much lower if the mills were better equipped, the methods of production more scientific and the transport from the forest to the saw-mills and from there to the town more satisfactory.

In order to develope the timber industry in the Ussuri country, it would be necessary to construct about 150 to 200 versts of side lines at the stations Ussuri, Iman, Bikin, and Hor. Then the rivers should be cleaned in order to enable the floating of timber in spring. It would be further necessary to erect well equipped saw-mills and 3-ply wood factories in places best suited for the purpose. Great advantages are offered by the village Rakitnee situated on the river Vak. It would be necessary to construct a line about 50 versts long connecting that village with the station Iman. The line would cross a plain and no tunnels and bridges would be required. Another place is the confluence of the rivers Daubikhe and Ulakhe which could be reached by extending the Sviagin line some 30 versts. It would also be advisable to construct two lines of an aggregate length of 100 versts from Bikin and Hor reaching right into the heart of the forests.

Simultaneously with saw-mills there should also be constructed various plants for the extraction by products from timber, paper mills, wood-pulp mills, and others. Well equipped mills with railways, rafting rivers, and low tariff will appreciably lower the price of timber and it would find a ready sale on foreign markets. It is only necessary to adapt the production to the requirements of those markets. The enormous reserves of high-grade timber, the close proximity of consuming markets, requiring timber in large quantities creates especially favorable conditions for a development of that industry and facilitates competition with Oregon pine, which is more expensive than cedar.

Apart from markets adjoining the maritime province, Ussuri timber could enjoy a great and steady demand in more distant countries of the Pacific, as in the instance of Australia, which requires about 10 million cubic feet of timber for cases, this figure showing a tendency to grow. Here also Ussuri timber has the possibility of competing with Oregon pine.

Naturally the organization of the timber industry in the Ussuri country will only be made possible with the assistance of foreign capital since the Russians have none. There is but little doubt that foreign firms interested in that industry will be able to take advantage of the situation and begin the exploitation of the enormous reserves of timber, provided, naturally, that conditions are created guaranteeing a possibility of private enterprise and of a sound organization of the enterprise.

CHINESE GOVERNMENT RAILWAYS

Approximate Financial Returns for the Year 1922

The following figures are only the approximate returns of the various lines, and are subject to revision when the complete annual for the year is published:—

Name of Line	Operating Revenues	Operating Expenses	Net Operating Revenues	Income Debits	Income Credits	Net Debits	Surplus for the Year
Peking-Hankow	$25,500,000	$12,500,000	$13,000,000	$4,000,000	$650,000	$3,350,000	$9,650,000
Peking-Mukden	20,451,791	13,873,151	6,578,640	1,141,372	423,494	717,878	5,860,762
Tientsin-Pukow	16,000,000	9,750,000	6,250,000	4,920,000	322,000	4,598,000	1,652,000
Peking-Suiyuan	7,581,644	4,219,406	3,362,238	3,127,636	117,737	3,009,899	352,339
Shanghai-Nanking	7,572,529	4,525,891	3,046,638	1,604,113	41,143	1,562,970	1,483,668
S'hai-Hangchow-Ningpo ..	3,663,009	3,183,613	479,396	1,258,714	165,357	1,093,357	*Def* 613,961
Cheng Tai	3,590,118	1,597,419	1,992,699	290,262	62,520	228,742	1,764,951
Canton-Kowloon	1,540,000	1,030,000	510,000	760,000	190,000	590,000	*Def* 60,000
Kirin-Changchun	2,783,250	1,810,220	973,030	416,460	28,910	387,550	585,480
Taokow-Chinghua ..	1,375,000	622,000	753,000	507,000	2,000	505,000	248,000
Lung-Hai	3,150,000	1,400,000	1,750,000	—	—	—	1,750,000
Kaifeng-Honan	2,436,000	1,036,000	1,400,000	382,000	62,520	227,742	1,764,957
Hupeh-Hunan	1,890,788	1,629,859	260,929	2,319,059	174,735	2,144,324	*Def* 1,883,395
Chuchow-Pinghsiang ..	519,851	632,000	*Def* 112,149	1,500	2,500	*Credit* 1,000	*Def* 111,149
Changchow-Amoy ..	76,826	85,738	*Def* 8,912	127,025	1,189	125,836	*Def* 134,748
			Not arrived.				
Ssu-Tao, Chinese 1922	98,130,806	57,895,297	40,235,509	20,855,141	2,245,785	18,609,356	21,626,153
Government Railways 1921	95,218,000	52,503,000	42,715,000	21,539,000	2,536,000	19,003,000	23,712,000
Increase	2,912,806	5,392,297					
Decrease	—	—	2,479,491	683,859	290,215	393,644	2,085,847

(1) There is no report for the yearly Income Account, as the Lunghai Railway is still under construction.
(2) The approximate return of 1922 for the Ssu-Tao Railway is not reported.
(3) The approximate return of Lunghai for 1921 is not included.

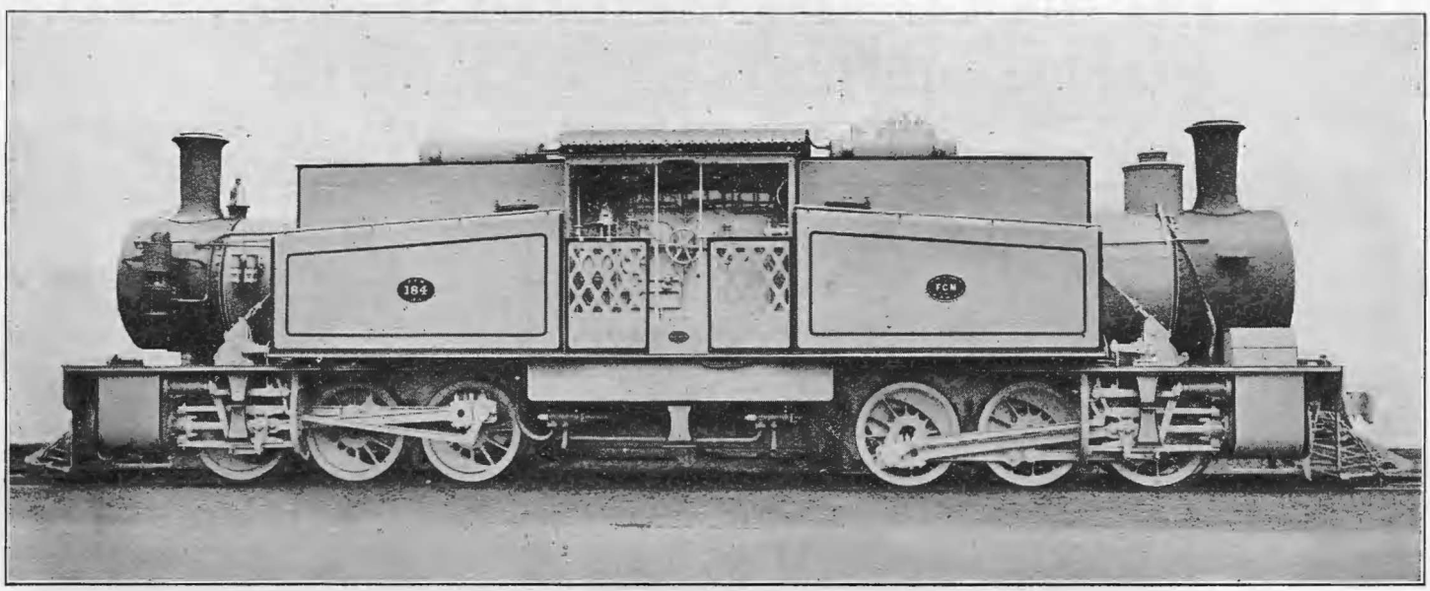
Government Bureau of Economic Information.

ASSOCIATED BRITISH LOCOMOTIVE MANUFACTURERS FOR CHINA

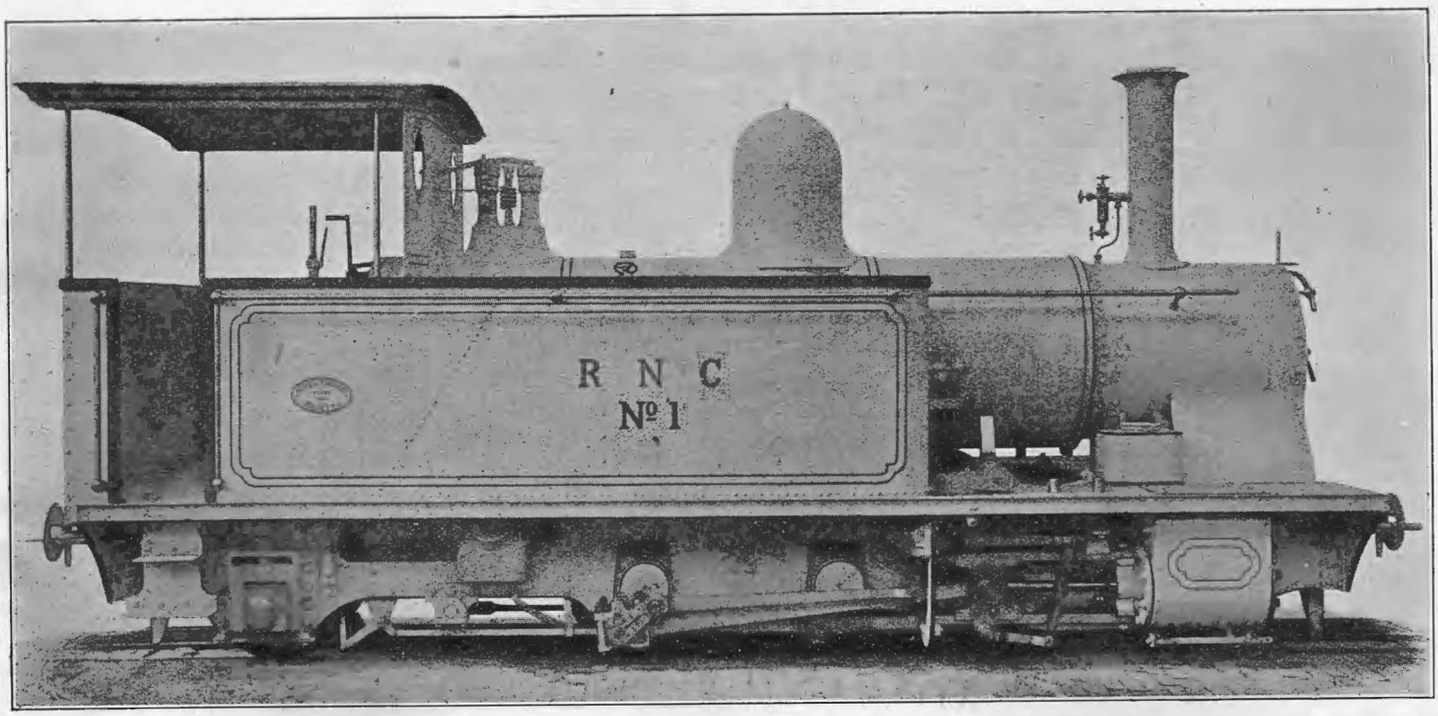
Head Office:
7 HOBART PLACE
GROSVENOR GARDENS
LONDON

TEL. ADDRESS: REBRITMAN, PEKING

Agents in China:
REPRESENTATION FOR
BRITISH MANUFACTURERS LTD.
46 WAI CHIAO PU CHIEH
PEKING



ANDREW BARCLAY SONS & CO., LTD.
THE AVONSIDE ENGINE CO., LTD.
W. G. BAGNALL LTD.
BEYER PEACOCK & CO., LTD.
HAWTHORN LESLIE & CO., LTD.
HUDSWELL CLARKE & CO., LTD.
THE HUNSLET ENGINE CO., LTD.
KITSON & CO., LTD.
NASMYTH WILSON & CO., LTD.
THE NORTH BRITISH LOCOMOTIVE CO., LTD.
ROBERT STEPHENSON & CO., LTD.
THE VULCAN FOUNDRY, LTD.
THE YORKSHIRE ENGINE CO., LTD.



AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

CHIERI

THE DAWN OF A NEW ERA

A PICTORIAL ACCOUNT OF THE JAPAN EARTHQUAKE

MINES OF INDO-CHINA

BEET SUGAR INDUSTRY OF JAPAN

JAPANESE SILK PRODUCTION

Vol. XIX October, 1923 No. 10

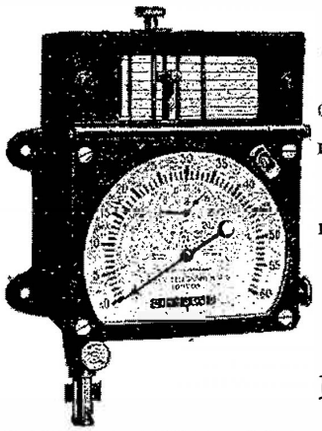
SHANGHAI, PEKING, TOKYO AND MANILA

上海仁記路第五號

遠東時報

THE BEST LOCOMOTIVE SPEED INDICATORS & RECORDERS

WITH CONJUGATE MOVEMENT



TELOC TYPE

Chart Feed on a Mileage Basis of 10 m/m per Mile.

INDICATES:—Speed.
Total mileage since application of Instrument.
Total mileage of each run.
Time of Day in Hours and Minutes.

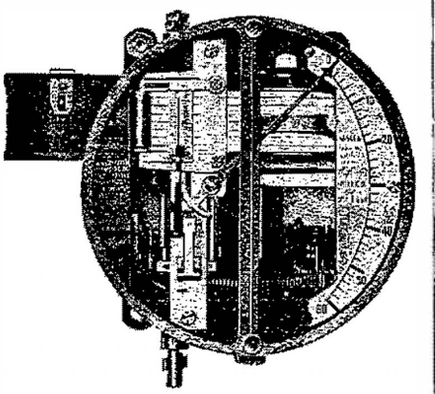
RECORDS:—Speed attained at any point of run.
Time the engine or coach is at work.
Distance covered.
Duration (up to 24 hours) and point of stops.
Time of Day in Hours and Minutes.
If desired apparatus to record working of Westinghouse or Vacuum Brakes.

HASLER TYPE

Chart Feed on a Time Basis of 4 m/m per Minute.

INDICATES:—Speed.

RECORDS:—Speed attained at any point of the run.
Time the engine or coach is at work.
Distance covered.
Duration and point of stops.
If desired bell can be fitted to ring at predetermined speed, or apparatus to record working of Westinghouse or Vacuum Brakes.



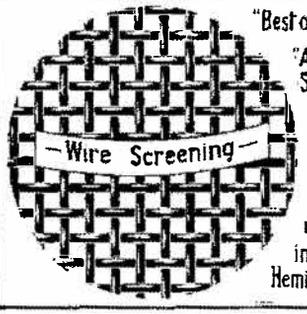
HASLER TELEGRAPH WORKS, 26 VICTORIA STREET, LONDON, S.W. 1

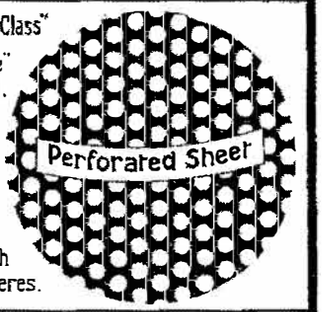
Agents in China: WILLIAM FORBES & CO., PEKING

Wire Screening and Perforated Sheets in all meshes, metals and gauges.

"Best of its Class"

"Agate" Steel.



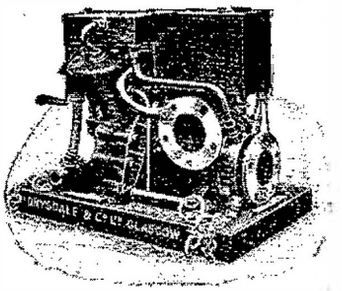


used in both Hemispheres.

N. GREENING & SONS, Lᵗᵈ., Manufacturers, Warrington, England.

"BON ACCORD"

CENTRIFUGAL PUMPS



FOR ALL PURPOSES

DRIVEN BY STEAM, ELECTRICAL GAS, OIL, OR BELT POWER.

Illustration shews a 4" Portable Petrol Driven Pump easily carried by two men. Capacity 90 tons water P. Hr. Specially arranged for dealing with muddy water.

FOR MARINE SALVAGE

CONTRACTORS, IRRIGATION, FLOOD DRAINAGE, ETC., ETC.

DRYSDALE & CO., LTD., Yoker, Glasgow

Tel. Address: Bonaccord, Glasgow

SHANGHAI TO SEATTLE 16 DAYS

A New Fast American

TRANS-PACIFIC SERVICE

between MANILA-HONGKONG

SHANGHAI

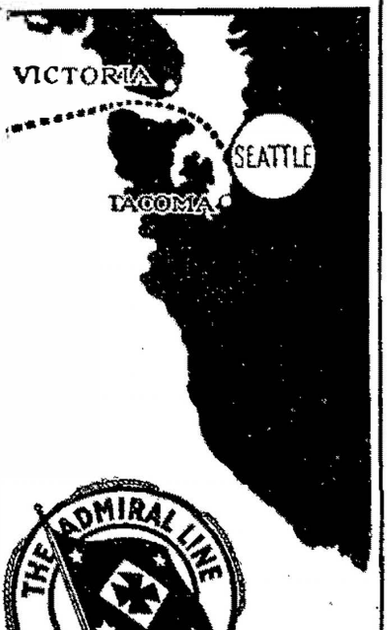
KOBE-YOKOHAMA

and PUGET SOUND

VICTORIA, B.C.—SEATTLE, WASH.

VIA THE SHORT ROUTE

UNITED STATES SHIPPING BOARD 535's



	Leaving Shanghai	Arr. Seattle
President Jefferson	Oct. 26	Nov. 13
" Grant	Nov. 9	Nov. 25
" Madison	Nov. 21	Dec. 7
" McKinley	Dec. 3	Dec. 19
" Jackson	Dec. 15	Dec. 31

REDUCED RATE TO EUROPE: £112 AND £120

AGENTS

Manila: No. 24 Calle David, Kobe: No. 7-A Kaigan-Dori.
Hongkong: No 4 Des Voeux Road. Yokohama: No. 75-A Main Street.
Shanghai: No. 29-B Nanking Road. Singapore: No. 2 Prince Street.

HEADQUARTERS FOR THE FAR EAST

No. 29-B Nanking Road, Shanghai.

E. F. TOWNSEND, Manager.
GEO. J. McCARTHY, Assistant General Passenger Agent.

THE ADMIRAL LINE

The ADMIRAL LINE

ANYWHERE ON THE PACIFIC

ADMIRAL ORIENTAL LINE

大正七年七月十日第三種郵便物認可

1924

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

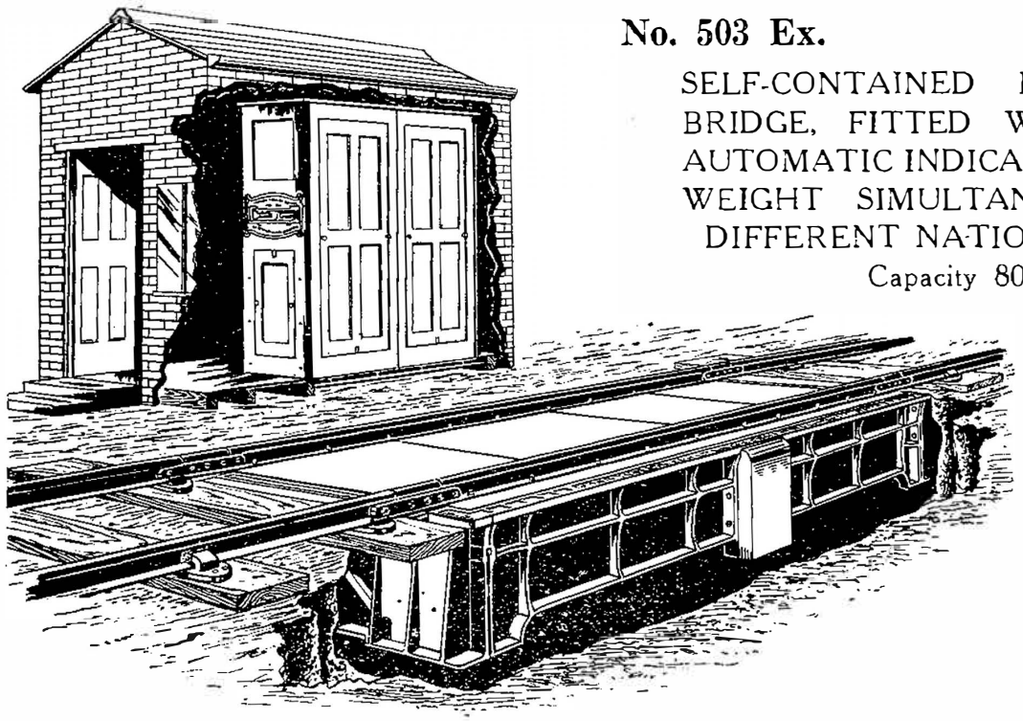
THE BRITISH EMPIRE EXHIBITION

THE JAPANESE TRAGEDY
AMERICAN RELIEF WORK IN JAPAN
A SUPERFLUOUS STATE DEPARTMENT
SHALL AMERICA CO-OPERATE WITH JAPAN?
ELECTRICAL RECONSTRUCTION IN JAPAN
SUPER POWER ZONES IN JAPAN
TRAMWAYS IN JAVA
JAVA TEA INDUSTRY
BEET SUGAR INDUSTRY IN JAPAN

Vol. XIX | November, 1923 | No. 11

P. CHIERI 1923

POOLEY



No. 503 Ex.

SELF-CONTAINED RAILWAY WEIGH-BRIDGE, FITTED WITH THE No. 538 AUTOMATIC INDICATOR SHOWING THE WEIGHT SIMULTANEOUSLY IN TWO DIFFERENT NATIONAL STANDARDS.
Capacity 80 Tons.

HENRY POOLEY & SON, LD.,

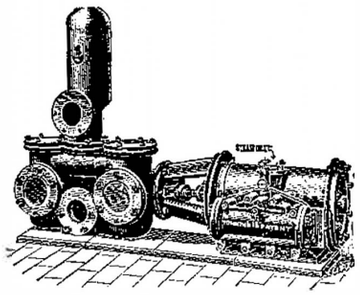
EXPORT DEPT.,

JOHN BRIGHT ST.,

BIRMINGHAM,

ENGLAND.

TELEGRAMS: POOLEY BIRMINGHAM. CODES: A.B.C. 5th Marconi International Western Union, Lieber's.



STEAM PUMP for General Purposes

WE MANUFACTURE

PUMPS

FOR EVERY PURPOSE

To be worked by HAND, STEAM, BELT, WIND, WATER or ELECTRIC POWER

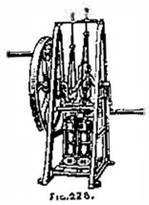
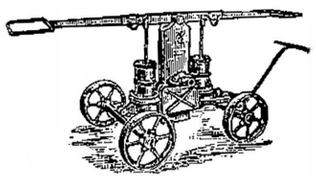
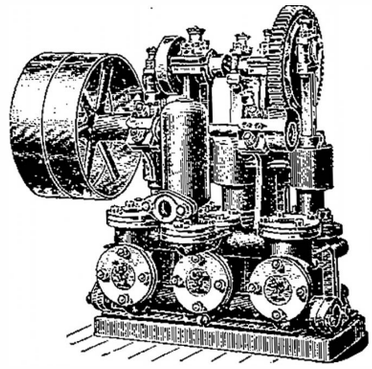
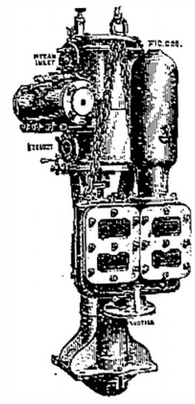


Fig.226.

Fig.160.







SINKING PUMPS for COLLIERIES, MINES, Etc.

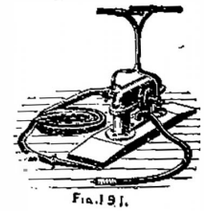
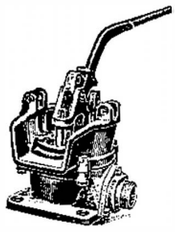


Fig.191.

Write for "Eastern" List.



JOSEPH EVANS & SONS

(WOLVERHAMPTON) LTD.

CULWELL WORKS,

WOLVERHAMPTON, ENGLAND.

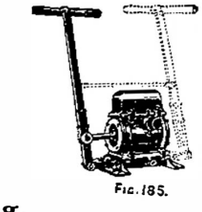


Fig.185.

Agents for China

J. WHITTALL & CO., LTD.

16 Victoria Terrace, Tientsin

Stocks Kept in Tientsin

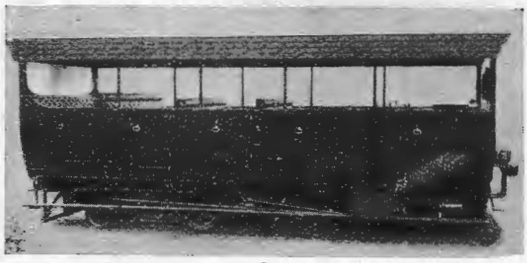
26, Hsi Tang Tze Hutung, Peking

Contractors to: The Admiralty, The War Office, The India Office, The Crown Agents for the Colonies, Colonial and Foreign Governments

Internal Combustion Rail Cars, Inspection Cars, Coaches, Tramcars, Trailers, Locomotives, Tractors, etc.

British built throughout and supplied to upwards of 200 Railways in all Parts of the World
Designs to meet individual requirements

Passenger Freight Shunting | Mining Harbours Docks | Plantations Logging Contractors



The Drewry Car Co., Ltd.
(and McEwan Pratt & Co., Ltd.)
14 River Plate House, London, E.C.2
Telegrams: "Effervesce, London"
Works: Burton-on-Trent, England

SUPERHEATERS

ELESCO

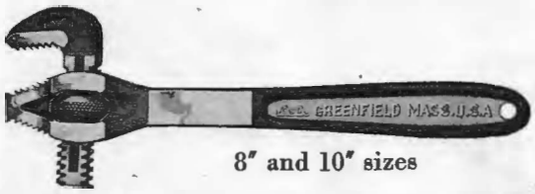
STEAM SUPERHEATERS for Locomotive, Industrial and Marine Service
Feed Water Heater Equipment for Locomotives
Boiler Feed Pumps Pipe Coils
Designing Engineers and Manufacturers

THE SUPERHEATER COMPANY

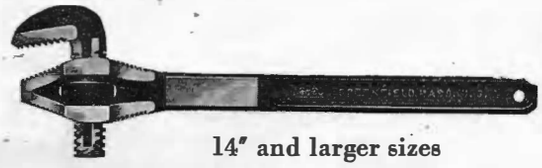
General Offices: 17 East 42nd St., New York, U.S.A.

Little Giant—The New Pipe Wrench

"THE WRENCH WITH THE ORANGE HANDLE"



8" and 10" sizes



14" and larger sizes

A new design which gives increased strength, increased simplicity, increased usefulness, *less* weight, and fewer parts.
The "*Little Giant*" Pipe Wrench has become popular at once because of the end opening jaws. It can be thrust straight on a pipe like a pair of pliers, and will be found useful in places which are beyond the reach of an ordinary pipe wrench.

The arrangement of the jaw, which can be engaged at will with 2 or 4 sets of teeth on the handle can be seen in the picture. These extra sets of teeth mean long life. The "*Little Giant*" Wrench is drop-forged and heat-treated throughout.
Merchants will be particularly interested in the light weight (less than an ordinary pipe wrench) and the few parts. The "*Little Giant*" has only 3 parts, which means a smaller investment in replacements. Any of our representatives will be glad to quote prices.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

Canadian Plant: Greenfield Tap & Die Corporation of Canada, Limited, Galt, Ontario.
Cable address: "Getede"
REPRESENTATIVES:

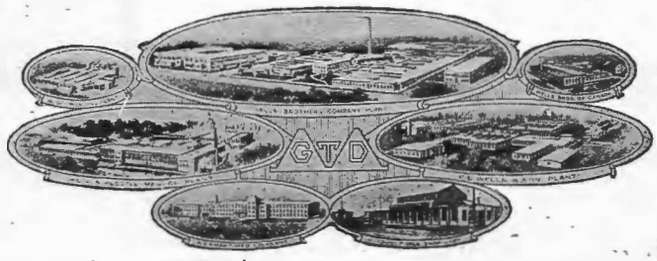
JAPAN.

MULLER, PHIPPS & SELLERS, LTD.
17 Itachibori Kitadori 5-chome, Nishi-Ku
Osaka, Japan
Fudo Bank Bldg., 9.2-chome
Honkokucho, Nihonbashiku
Tokyo, Japan

HORNE COMPANY LTD.
6-7 Takayama-cho
Kyobashi-Ku
Tokyo, Japan

CHINA.

MULLER & PHIPPS (CHINA) LTD.
5 Ice House St.
P. O. Box 25, Prince's Bldg., Hongkong, China
2 Canton Road
Shanghai, China

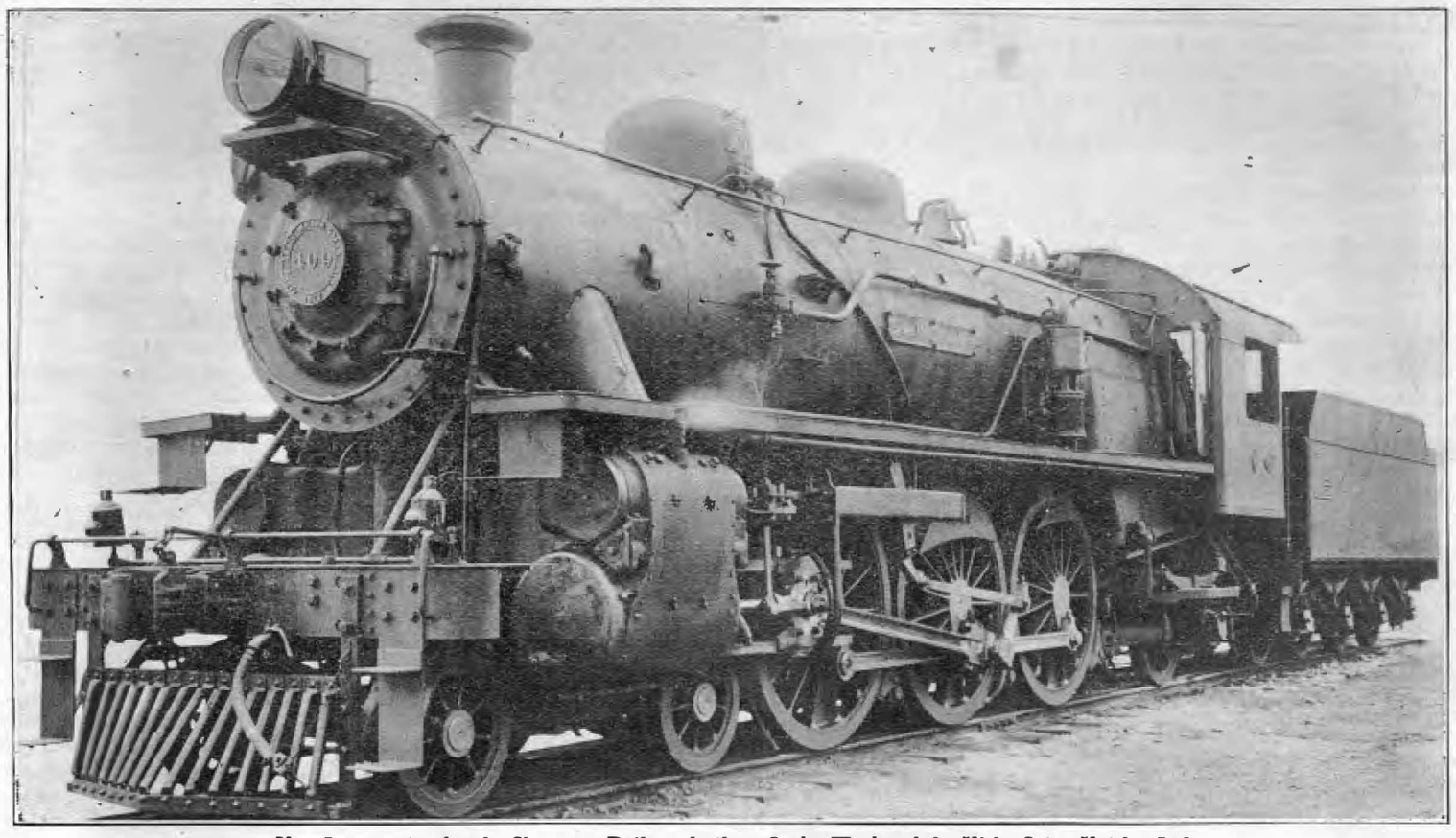


Plants of GTD *Corporation, World's Largest Manufacturers of Screw-threading Tools*

per cent. saving in coal burned when pulling the train. Another big saving is effected by the elimination of one fireman.

At present the hand-fired locomotives are coaled by coolies who carry the coal in baskets from the coal car to the tender. At first thought this might appear to be a very expensive method of handling the coal, but the wages of the men are about 8 sen (4) cents) an hour, so this is really not very expensive. When using pulverized coal, however, there is even a saving in this cheap labor as only three men are required to dump the coal car and look after the pulverizing plant while there are about 16 men required to handle the coal for the hand-fired locomotives.

The illustrations show the type of locomotive on which the equipment has been installed, the methods used in coaling the hand-fired locomotives and the pulverizing and coaling plant installed at Taihoku, which is situated between the 18-mile and 45-mile operating districts.—*Railway Age-Gazette.*



New Locomotive for the Shantung Railway built at Osaka Works of the Kisha Seizo Kaisha, Ltd.

New Locomotive for the Shantung Railway

TYPICAL of the development of the rolling stock industry in Japan is the growth of the Kisha Seizo Kabushiki Kaisha, one of the first private enterprises to enter the field in competition with foreign manufacturers for the supply of the domestic railway requirements. This company was organized in 1896 after the termination of the Sino-Japanese war, and has since specialized in the manufacture of locomotives. Foreign engineers who have inspected the works and its products frankly state that these not only compare favorably with locomotives made in Europe and America, but in some particulars possess distinct advantages. Many of the finest and most powerful engines in operation on the imperial government railways have been turned out at the Osaka Works of this company. Recently this company built the standard gauge locomotive ordered by the Shantung railway administration and now are building six locomotives for the Chosen lines of the South Manchuria Railway.

In addition, passenger and freight cars of all types and sizes are manufactured for the domestic narrow gauge railways and electric tramways, while standard gauge cars have been built for the Korean and Manchurian lines. The shops are equipped to make cars for any gauge of line.

Kowloon Tramways

PARTICULARS of the new Kowloon tramway service given out by the Hongkong public works department provide for tenders for the running and maintaining of the following service:—

Commencing at the Star Ferry pier, the lines will run up Salisbury Road, then turn off along Nathan Road and Coronation Road, turning to the left up to Sham Shui Po; the length approximately 2.8 miles.

Another route will be on through Salisbury Road and Chatham Road to a point beyond the junction with Gascoigne Road, where the reservoir is; a distance approximately of 1.6 miles.

A third route will commence just before the mortuary on Coronation Road, and branch off to the right along a new road running up to the Kowloon Tong foothills (distance 1.6 miles.) Route four will be along a new road at right angles to Coronation Road, from near its terminus, up to Kau Pai Shek (about 1.7 miles). A fifth route will be along Gascoigne Road, from Nathan to Chatham Road, approximately half a mile. The final route will run from the reservoir at Chatham Road along an extension of this road way up to Matau Wai village, about one mile in length.

The successful tenderer will pay the government an annual rent, being at least ten per cent. of the net revenue. The sum of $50,000 will have to be deposited on the signing of the agreement. The construction is to be completed by December 31, 1925. The term will be for twenty-five years, determinable at the option of the government at the end of the fifteenth or twentieth year, on six months' notice. The company is to operate a system and type of car approved by government, who will provide all land required for the service.

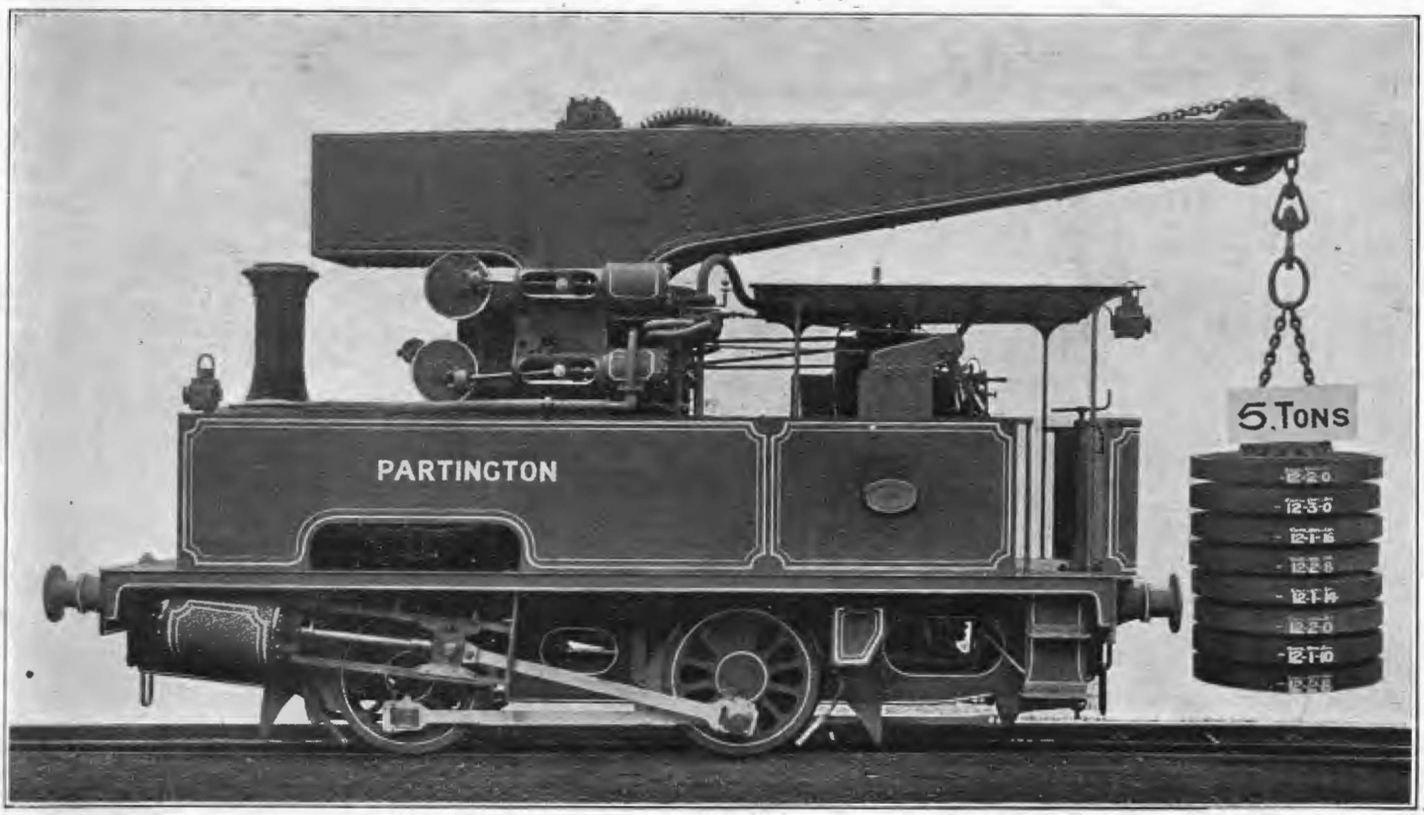
ASSOCIATED BRITISH LOCOMOTIVE MANUFACTURERS FOR CHINA

Head Office:
7 HOBART PLACE
GROSVENOR GARDENS
LONDON

TEL. ADDRESS: REBRITMAN, PEKING

Agents in China:
REPRESENTATION FOR
BRITISH MANUFACTURERS LTD.
46 WAI CHIAO PU CHIEH
PEKING

ANDREW BARCLAY SONS & CO., LTD.
THE AVONSIDE ENGINE CO., LTD.
W. G. BAGNALL LTD.
BEYER PEACOCK & CO., LTD.
HAWTHORN LESLIE & CO., LTD.
HUDSWELL CLARKE & CO., LTD.
THE HUNSLET ENGINE CO., LTD.
KITSON & CO., LTD.
NASMYTH WILSON & CO., LTD.
THE NORTH BRITISH LOCOMOTIVE CO., LTD.
ROBERT STEPHENSON & CO., LTD.
THE VULCAN FOUNDRY, LTD.
THE YORKSHIRE ENGINE CO., LTD.



AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

DOLLAR DIPLOMACY IN CHINA

P. CHIERI 1924

JAPANESE HIGH VOLTAGE TRANSMISSION SYSTEMS

HOW AMERICA CAN INTERVENE

TAPIOCA INDUSTRY IN JAVA

INDO-CHINA RAILWAYS

Vol. XIX December, 1923 No. 12

SHANGHAI, PEKING, TOKYO AND MANILA

A.L. TAYLER.

DORMAN, LONG & Co., Ltd.

Steel Manufacturers,

Bridge Builders & Constructional Engineers,

MIDDLESBROUGH, ENGLAND.

Telegraphic Address:
"DORMAN-MIDDLESBROUGH."

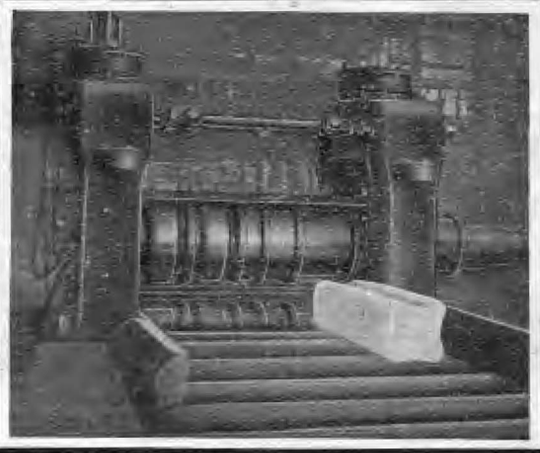
Codes —
BENTLEY'S; A.B.C. (5th and 6th Editions) and WESTERN UNION (Universal & 5 Letter).

Britannia Steelworks,
MIDDLESBROUGH.

Open-Hearth STEEL JOISTS, ANGLES and OTHER SECTIONS, RAILS.

Open-Hearth STEEL BARS in long lengths suitable for

FERRO-CONCRETE WORK, BILLETS AND BLOOMS.



Redcar Iron and Steel Works, Redcar.

Steel Works and Rolling Mill Dept.

Plate Mills capable of Rolling all Plates for **Shipbuilding and Engineering** purposes, from $\frac{3}{16}$" to 1½" thick, fulfilling the requirements of British Standard Tests, Board of Trade, Admiralty, Lloyds, etc.

Universal Plates with Rolled Edges 12" to 42" wide up to 90-ft. long.

Clarence Steel Works and Rolling Mills,
PORT CLARENCE.

High-class Steel in quality from Dead Soft to 1.25 per cent. Carbon for the manufacture of Wire, Springs, Files, Saws, Forgings, Stampings, Rifle Barrels, Agricultural Implements, etc. Conductivity Steel to stand General Post Office, India Office and British Railway Tests.
Electrically Melted Steels of all Carbons.

NICKEL ALLOY STEEL.

Flange and Bulb Head Rails, Billets, Slabs, etc.

Ayrton Rolling Mills,
MIDDLESBROUGH.

Galvanized Corrugated and Plain Sheets,

Ridging, Gutters, Downpipes, Fountain Heads, etc.

Ordinary Galvanized Fittings kept in Stock.

Cleveland Wire Mills,
MIDDLESBROUGH.

Wire Rods and all kinds of Wire for all purposes. Telegraph & Telephone Wire. Annealed Core Wire. Galvanized Seizing Wire. Galvanized Rigging Wire. Galvanized & Varnished Fencing Wire. Galvanized Strand & Barb Wire. Galvanized Cable Wire.

Galvanized Patent Steel Hawser Wire to Lloyd's Tests.

Bright Patent and Plough Steel Rope Wire.

The Mills can supply the **longest single length** of Rods or Wire without weld or joint of anyone in the Trade.

Constructional Department,
MIDDLESBROUGH.

STRUCTURAL STEELWORK

for all purposes.

Speciality:

STEEL FRAME BUILDINGS

for home and abroad.

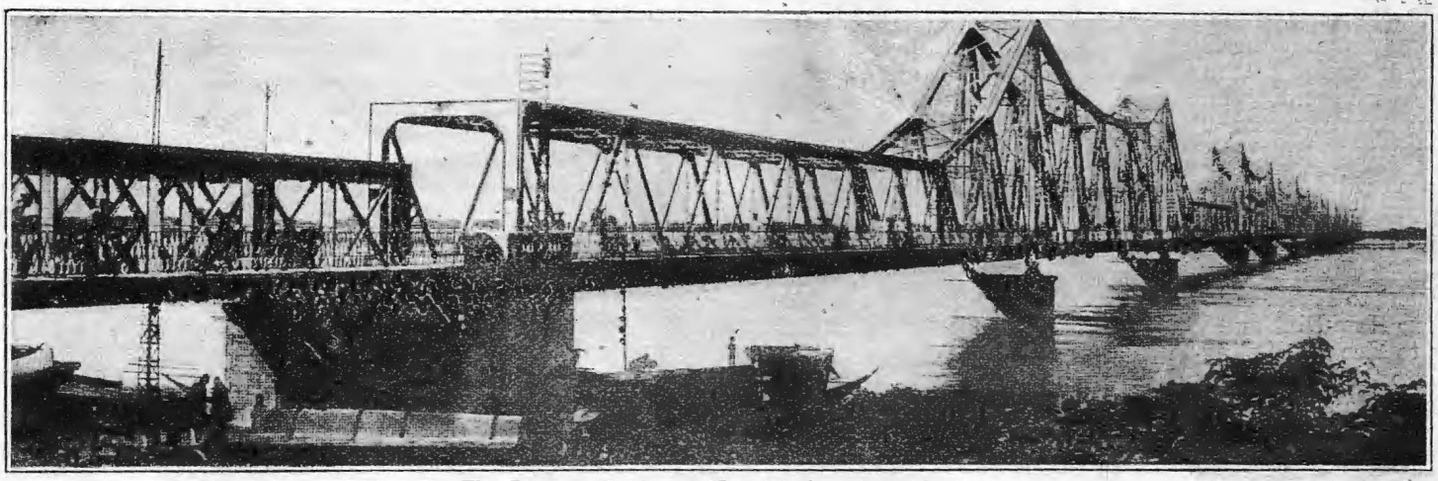
AGENTS:—

REPRESENTATION for BRITISH MANUFACTURERS, LTD.

CHING MING BUILDINGS, BRITISH CONCESSION, HANKOW.

43 KIANGSE ROAD, SHANGHAI.

REGINES BUILDINGS, LEGATION STREET, PEKING.



The Doumer Bridge at Hanoi before its widening

Indo-China Railways—1.

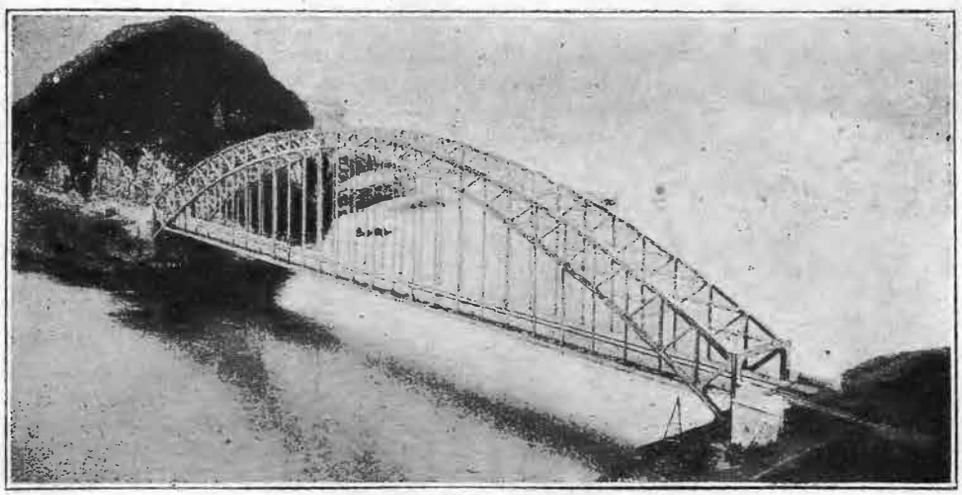
History

THE construction of the railways of Indo-China may be historically divided into three periods: (1) Prior to 1898; (2) from 1898 to 1910, during which time the program of 1898 was being realized, and, (3) since 1910, when improvements and additions are being made.

I.—Prior to 1898

A. Saigon-Mytho Railway

Towards 1880 a first proposal for railway construction in Cochin-China was made and this included a line from Saïgon to Vinh-Long with extensions to Soc-trang and to Lang-Yuyen, Chau-doc and Phom-Pen. The plans and estimates were worked out in the colony and submitted to the French admiralty, who decided that it would be better to omit for the time being the extensions and thus confine the first attempt at railway construction to a short section in a comparatively easy country, so obtaining useful experience for extensions later on. This line was built by a private company who ran it till December 1911 when the colony took it over.



525-foot Span Steel Railway Bridge over the Song-ma on the line from Hanoi to Vinh and Ben Thuy

B. Hanoi, Nam-Kwan or Kwang-si Railway

The hard and laborious campaigns for the pacification of Upper Tonkin between 1885 and 1894 necessitated the maintaining of numerous effectives in the mountain-country round about Langson and Cao-Bang, and as early as 1889 the building of a railway of 60 cm gauge was contemplated. This line was to run from Phu-Lang-Thuong (up to which point light boats could navigate all the year round from Haïphong) to Langson.

Work was started in May 1890 but all sorts of difficulties caused delay. Labor was rare and also difficult to maintain in an unhealthy country and where robber bands, safe in the mountain fastnesses of Cai-Kinh, frequently raided the camps in search of provisions and of European hostages for which they could claim ransom.

Eventually the French parliament intervened and, abandoning the system of grants from the mother-country by means of which the expenses had hitherto been met, it made more ample arrangements for the improvement of the colony to be met by an important loan.

This loan of 80,000,000 francs was authorized by the law of February 10, 1896 and was subscribed 28 times over, thus showing the value of the credit of Indo-China on its first appearance in the home market. Out of this sum 13,200,000 francs were allocated for the liquidation of other works undertaken prior to the Phu Lang Thuong-Langson railway, and 20,000,000 francs for the extension of this line from Phu-Lang-Thuong to Jia-Lam and from Langson to Dong-Dang as well as the widening of the gauge from 60 cm to 1 metre (from 1-ft. 11⅝-in. to 3-ft. 3⅜-in.).

The portion of the line between Jia-Lam and Phu-Lang-Thuong cost about 160,000 francs per mile and was carried out between 1897 and 1900. The other extension from Langson to Dong-Dang cost about 272,000 frs. per mile and was carried out between 1897 and 1901. The actual cost of converting the gauge came to about 96,000 frs per mile.

At the same time it was considered advisable to throw a railway bridge over the Red River and thus join Hanoï up to Jiam-Lam and to other projected lines. Having decided to meet the cost out of the funds of the protectorate, tenders were invited and most of the great French firms competed, the contract being eventually let to Messrs. Davdé et Pillet for the sum of 5,900,000 francs. The bridge begun early in 1898 was opened in February 1902, thus connecting Hanoï directly with the Chinese frontier by a line 105 miles long.

II.—From 1898 to 1910

The 1898 Program

While the latter part of the Kwang-Si railway was being constructed a vast project of railways was being worked out with the view of not only assuring the defence of the country, but also

of developing each of the five countries of the union and facilitating intercommunication between them as well as connecting them up with their foreign neighbors. This project was submitted to the French parliament, before whom His Excellency Governor of General Doumer personally pleaded, and was approved by the law of December 25, 1898.

It provided for the following lines :—

Names of Lines	Approximate length miles	Approximate cost francs
Hai-phong to Hanoi and Lao-kai	237	50,000,000
Hanoi to Nam-Dinh and Vinh	203	32,000,000
Turan to Hue and Kwang-Tri	109	24,000,000
Saïgon to the Khan-Koa and the Lang-Bian	404	80,000,000
Mytho to Vinh-Long and Cantho	57	10,000,000
Miles ..	1,010	196,000,000

These costs were met by means of a loan of 200,000,000 francs raised by three calls. This was found sufficient for all the proposed lines with the exception of that from Mytho to Cantho (never started) and the branch to Lang-Bian (unfinished). The line between Haïphong and Lao-kai entailed, however, heavy supplementary expenditure.

By the same law the general government was authorized to participate to the amount of 3,000,000 francs in the private company who undertook to build a railway between Lao-kai and Yunnan in China. The authorization to build this line was obtained from China in 1898 as part of the advantages guaranteed to foreign powers consequent on the war between China and Japan.

Realization of the 1898 Program

1. Railways Worked by the Colony

HANOI TO VINH, TURAN TO DONG-HA AND SAIGON TO NHATRANG

These railways were built in a similar way to that adopted for the two ends of the Langson line. The earthworks, the buildings and the laying of the rails were let by tender in lots of various sizes. All metal work was let by competition. The permanent-way and all accessories as well as the rolling-stock were ordered direct by the administration. This method has generally been found satisfactory to the administration, whenever it has been possible to furnish the contractor with fully detailed plans, and the work was in a well-known region where everything was plain sailing and labor easy to obtain, and where at the same time the staff of inspectors was ample and efficient and there was no need to rush the work.

It may be added that the cost of the completed work never surpassed the estimate by more than 25 to 33 0/0 which was a much better result than was the case in the two other systems tried, viz.: payment by schedule on the Langson railway and letting by contract on the Saïgon-Mytho and Lao-kai-Yunnantu railways.

A. Railway from Hanoï to Nam-Dinh, Ninh-Binh, Thanh-Hoa and Vinh.

This was carried out from 1901 to 1905.

From every point of view—planning, construction, opening, country run through and running—it may be divided into three sections :

(1) From Hanoï to slightly beyond Ninh-Binh (73 miles) in the Tonkin delta ;

(2) From this point to Song-Ma (81 miles) in the rolling and but slightly cultivated country between Tonkin and North Annam ;

(3) From Song-Ma to Vinh (Benthuy) a distance of 49 miles joining the two centre of production in North-Annam—the deltas of the Song-Ma (Thanh-Hoa) and the Song-Ka (Vinh).

In accordance with the law authorizing the loan decrees were issued as follows :

On April 20, 1890 for the two end sections, and on December 7, 1900 for the intermediate link which was delayed owing to there being a choice of plans on the Tonkin-Annam frontier and to the difficult work necessitated by the bridging of the Song-Ma river.

On each of these sections the earthworks, ballasting and laying of the permanent way were let in one contract, and the important steel bridges in three separate tenders.

The Hanoï to Ninh-Binh section was started on January 9, 1903 and in December of the same year trains ran as far as the Song-Ma. The bridge over this river with a span of 525-ft. was completed by the end of 1904.

The completion of the line was delayed by extraordinary floods which submerged it in several places. This necessitated the raising of the road-bed and other supplementary works including the facing of some of the embankments with stone at the various weak spots. It was possible, however, to open the line on March 17, 1905 and it has been running without a hitch ever since.

Including all this extra work this railway cost 41,000,000 francs as against the 32,000,000 estimated.

B. Railway from Turan to Hue, Kwang-tri and Dhong-Ha.

This line, like the one just described, forms part of the great Trans-Indo-China trunk railway as proposed in 1898.

The first part built was from Turan to Hue on account of the political necessity of connecting up the capital of Annam with a port easily accessible to boats plying on the surrounding seas. The second part from Hue to Dong-ha was built solely as an eventual part of the great trunk railway.

The earthworks, etc., of the Turan-Hue section were at first carried out by contract and eventually by schedule. This was completed by the end of 1905 and the permanent way in 1906, the line being opened on December 15 of the same year.

The second section from Hue to Kwang-tri was authorized by decree on January 27, 1905 and was opened during 1908 in four successive parts.

The running of this line has always been at a loss which will probably continue until it has been connected up to the other lines north and south of it. At the same time it is liable to frequent interruptions owing to typhoons and floods.

Its total cost including everything was 34,500,000 francs being 7,500,000 over the estimate, of which 6,900,000 frs. were incurred on the Turan-Hue section.

C. Railway from Saïgon to Khanh-Hoa.

Two projects were considered each having a common portion of 82 miles between Saïgon and Tan-Linh, running thence either along the coast with a branch to Langbian or inland to Djiring and direct to Langbian.

The first named project was eventually adopted and work on the first 82 miles was authorized by the decree of June 17, 1900, but progress was hindered by numerous difficulties, not the least of which was the insufficiency and instability of labor, and it was not till the beginning of 1908 that this section was opened.

A decree dated January 27, 1905 authorized the second section but here again the same difficulties were met with and it was only in 1913 that this part was opened.

The total cost of the line from Saïgon to Khan-hoa amounted to 73,000,000 francs.

2. Railway Worked by the Indo-China and Yunnan Railway Company.

The part of this railway running from Haï-phong to Lao-kai and lying wholly in Tonkin was constructed by the colonial government who, in accordance with the agreement of 1901, was to hand it over all complete to the private company.

Where running through the delta between Haï-phong and Vietri this line was certain of a heavy traffic, but beyond it was merely a link with Yunnan.

The decree authorizing the first named section was dated April 21, 1899 and that for the second section December 7, 1900.

The work on the first section were carried out between 1900 and 1903 without any difficulty and plenty of efficient labor was available. The line was handed over to the Company and opened between Haï-phong and Jia-Lam in April 1903, and between Jia-Lam and Vietri in November of the same year.

On the second section between Yen-Bai and Lao-kai, passing through a desert and unhealthy region, it was very difficult to obtain labor so that it was in May 1906 only when the line was handed over to the Company and even then the last 95 miles before Lao-kai were not complete.

The line from Lao-kai to Yunnan-fu was constructed and equipped by the Company, the rôle of the colony being confined to a subsidy of 12,500,000 francs and an option of purchase for 3,000,000 francs during 75 years.

of developing each of the five countries of the union and facilitating intercommunication between them as well as connecting them up with their foreign neighbors. This project was submitted to the French parliament, before whom His Excellency Governor of General Doumer personally pleaded, and was approved by the law of December 25, 1898.

It provided for the following lines :—

Names of Lines	Approximate length miles	Approximate cost francs
Hai-phong to Hanoi and Lao-kai	237	50,000,000
Hanoi to Nam-Dinh and Vinh	203	32,000,000
Turan to Hue and Kwang-Tri	109	24,000,000
Saïgon to the Khan-Koa and the Lang-Bian	404	80,000,000
Mytho to Vinh-Long and Cantho	57	10,000,000
Miles ..	1,010	196,000,000

These costs were met by means of a loan of 200,000,000 francs raised by three calls. This was found sufficient for all the proposed lines with the exception of that from Mytho to Cantho (never started) and the branch to Lang-Bian (unfinished). The line between Haïphong and Lao-kai entailed, however, heavy supplementary expenditure.

By the same law the general government was authorized to participate to the amount of 3,000,000 francs in the private company who undertook to build a railway between Lao-kai and Yunnan in China. The authorization to build this line was obtained from China in 1898 as part of the advantages guaranteed to foreign powers consequent on the war between China and Japan.

Realization of the 1898 Program

1. Railways Worked by the Colony

HANOI TO VINH, TURAN TO DONG-HA AND SAIGON TO NHATRANG

These railways were built in a similar way to that adopted for the two ends of the Langson line. The earthworks, the buildings and the laying of the rails were let by tender in lots of various sizes. All metal work was let by competition. The permanent-way and all accessories as well as the rolling-stock were ordered direct by the administration. This method has generally been found satisfactory to the administration, whenever it has been possible to furnish the contractor with fully detailed plans, and the work was in a well-known region where everything was plain sailing and labor easy to obtain, and where at the same time the staff of inspectors was ample and efficient and there was no need to rush the work.

It may be added that the cost of the completed work never surpassed the estimate by more than 25 to 33 0/0 which was a much better result than was the case in the two other systems tried, viz.: payment by schedule on the Langson railway and letting by contract on the Saïgon-Mytho and Lao-kai-Yunnantu railways.

A. Railway from Hanoï to Nam-Dinh, Ninh-Binh, Thanh-Hoa and Vinh.

This was carried out from 1901 to 1905.

From every point of view—planning, construction, opening, country run through and running—it may be divided into three sections :

(1) From Hanoï to slightly beyond Ninh-Binh (73 miles) in the Tonkin delta ;

(2) From this point to Song-Ma (81 miles) in the rolling and but slightly cultivated country between Tonkin and North Annam ;

(3) From Song-Ma to Vinh (Benthuy) a distance of 49 miles joining the two centre of production in North-Annam—the deltas of the Song-Ma (Thanh-Hoa) and the Song-Ka (Vinh).

In accordance with the law authorizing the loan decrees were issued as follows :

On April 20, 1890 for the two end sections, and on December 7, 1900 for the intermediate link which was delayed owing to there being a choice of plans on the Tonkin-Annam frontier and to the difficult work necessitated by the bridging of the Song-Ma river.

On each of these sections the earthworks, ballasting and laying of the permanent way were let in one contract, and the important steel bridges in three separate tenders.

The Hanoï to Ninh-Binh section was started on January 9, 1903 and in December of the same year trains ran as far as the Song-Ma. The bridge over this river with a span of 525-ft. was completed by the end of 1904.

The completion of the line was delayed by extraordinary floods which submerged it in several places. This necessitated the raising of the road-bed and other supplementary works including the facing of some of the embankments with stone at the various weak spots. It was possible, however, to open the line on March 17, 1905 and it has been running without a hitch ever since.

Including all this extra work this railway cost 41,000,000 francs as against the 32,000,000 estimated.

B. *Railway from Turan to Hue, Kwang-tri and Dhong-Ha.*

This line, like the one just described, forms part of the great Trans-Indo-China trunk railway as proposed in 1898.

The first part built was from Turan to Hue on account of the political necessity of connecting up the capital of Annam with a port easily accessible to boats plying on the surrounding seas. The second part from Hue to Dong-ha was built solely as an eventual part of the great trunk railway.

The earthworks, etc., of the Turan-Hue section were at first carried out by contract and eventually by schedule. This was completed by the end of 1905 and the permanent way in 1906, the line being opened on December 15 of the same year.

The second section from Hue to Kwang-tri was authorized by decree on January 27, 1905 and was opened during 1908 in four successive parts.

The running of this line has always been at a loss which will probably continue until it has been connected up to the other lines north and south of it. At the same time it is liable to frequent interruptions owing to typhoons and floods.

Its total cost including everything was 34,500,000 francs being 7,500,000 over the estimate, of which 6,900,000 frs. were incurred on the Turan-Hue section.

C. *Railway from Saïgon to Khanh-Hoa.*

Two projects were considered each having a common portion of 82 miles between Saïgon and Tan-Linh, running thence either along the coast with a branch to Langbian or inland to Djiring and direct to Langbian.

The first named project was eventually adopted and work on the first 82 miles was authorized by the decree of June 17, 1900, but progress was hindered by numerous difficulties, not the least of which was the insufficiency and instability of labor, and it was not till the beginning of 1908 that this section was opened.

A decree dated January 27, 1905 authorized the second section but here again the same difficulties were met with and it was only in 1913 that this part was opened.

The total cost of the line from Saïgon to Khan-hoa amounted to 73,000,000 francs.

2. Railway Worked by the Indo-China and Yunnan Railway Company.

The part of this railway running from Haï-phong to Lao-kai and lying wholly in Tonkin was constructed by the colonial government who, in accordance with the agreement of 1901, was to hand it over all complete to the private company.

Where running through the delta between Haï-phong and Vietri this line was certain of a heavy traffic, but beyond it was merely a link with Yunnan.

The decree authorizing the first named section was dated April 21, 1899 and that for the second section December 7, 1900.

The work on the first section were carried out between 1900 and 1903 without any difficulty and plenty of efficient labor was available. The line was handed over to the Company and opened between Haï-phong and Jia-Lam in April 1903, and between Jia-Lam and Vietri in November of the same year.

On the second section between Yen-Bai and Lao-kai, passing through a desert and unhealthy region, it was very difficult to obtain labor so that it was in May 1906 only when the line was handed over to the Company and even then the last 95 miles before Lao-kai were not complete.

The line from Lao-kai to Yunnan-fu was constructed and equipped by the Company, the rôle of the colony being confined to a subsidy of 12,500,000 francs and an option of purchase for 3,000,000 francs during 75 years.

The route finally adopted follows the valley of the Nam-Ti and reaches Yunnan-fu by the valleys of the Pa-Ta-Ho and the Tatshen-Ho. This was through a very difficult country and necessitated much bridging, tunelling, etc.

Recruiting the coolies, transporting material and provisions, arranging for the sanitation of the camps and protecting them against the raids of Chinese robbers were each and all difficult problems for the contractor. To this were added the technical difficulties of the line itself; 3.422 viaducts, bridges and culverts—an average of 11.7 per mile—of a total length of over three miles, and 155 tunnels totalling about 11½ miles in length. The steepest gradient was in 40 and the radius of the sharpest curve about five chains.

Delayed by frequent difficulties, the line was opened in successive sections between June 15, 1908 and April 1, 1910, on which latter date the first locomotive steamed into Yunnan-fu.

The traffic on this line has rapidly increased in spite of the frequent yearly interruptions in the broken ground of the Nam-ti and Pa-Ta-Ho valleys, where important supplementary works had to be carried out, on account of frequent land-slides during the rainy season.

Owing to all these difficulties the actual cost of the line largely exceeded the estimate of 94,000,000 francs, and was fixed by an arbitral commission in 1908 at the sum of 165,000,000. The colony was therefore obliged to furnish a new subsidy of 53,000,000 francs, which it raised by a loan authorized by the law of March 14, 1909.

III.—From 1910 to 1920

By 1911 the various railways authorized by the 1898 program were complete, except:

The Saïgon and Khan-hoa Railway which was still in progress, and the Saïgon, Mytho and Cantho Railway, which had not been begun.

Furthermore, towards the close of 1910 the credits arising from the loan of 200,000,000 francs were exhausted, so that a new loan of 90,000,000 was authorized by the law of December 26, 1912, to meet the cost of various works for the economic development of the colony, and included 22,600,000 francs for the completion of the reduced program of 1898, and 28,300,000 for planning and constructing the following new railways:

(1) The first portion of the Vinh and Dong-ha railway, eventually to form part of the Trans-Indo-China Trunk line, and

(2) A line from Dong-Dang to Na-Sham forming an extension of the already existing Kwang-Si railway.

The completion of the 1898 program included not only improvements on existing lines, but also the completion of the Saïgon and Khan-hoa railway with a branch line running towards the Lang-bian plateau, all of which was carried out between 1912 and 1914.

Plans for the Vinh and Dong-ha line had been prepared in 1897 for the 1898 program, and in 1912 were again taken up with the result that a decree, dated September 11, 1913, authorized a start on the first section between Vinh and Tanap. A subsequent decree, dated June 26, 1915, sanctioned a start being made on the portion between Dong-Ha and the river Nganson but the immense difficulty of obtaining labor and the general rise of prices due to the war paralysed the work so that by the end of 1919 the situation on the whole of this railway was as follows. Between Vinh and Tanap (5½ miles) the earth works, and the masonry of the large bridges and buildings were finished. On the second and third sections (82 and 45 miles) plans were completed and the line staked out.

The extension towards Na-Sham of the Kwang-Si railway was based on the idea of striking the Song-Ky-Kung at a point accessible to light craft at all times of the year. The cost was estimated at 1,800,000 francs. The work was authorized by the decree of April 16, 1913, and in 1919 everything was ready for the laying of the permanent-way; this however, was supplied only after much delay and the section from Dong-Dang to Na-Sham was opened for traffic in November 1921. The total cost, including sundry improvements, amounted to 3,400,000 francs; and it may be said that this large excess over the estimate was largely due to the high price of the piastre from 1919 to 1921.

IV.—Present Situation

No new railway has been opened since that between Dong-Dang and Na-Sham, but the extension of the existing railway system is one of the first items on the program of the government, especially the completion of the Trans-Indo-China main-line running from north to south and connecting up all the local capitals, and the building of new lines to open up Laos.

The construction of the Vinh and Dong-Ha section has been vigorously taken up and it is hoped that Hanoï and Hue will be connected up by railway by 1925. At the same time plans for lines between Hue, Nha-trang and Saïgon as well as from Saïgon to Pnom-Penh and the Siamese frontier have been started and a special commission composed of French specialists has been already engaged for some months in laying this out, while another commission is engaged on the plans of a railway from the Krong-pha to Saïgon line (or from some point on, the Trans-Indo-China main-line) to Dalat, the important hill-station on the healthy and picturesque Langbian plateau. This will be a mountain railway from Dalat to Krong-pha, the present terminus of the Langbian branch.

Before the end of the year a start will be made on the plans of a railway in Northern Annam to connect Laos with the Gulf of Tonkin and passing through Tanap and Tah Kek.

Finally plans for the extension of the Saïgon to Mytho line towards Soc-trang and Bac-lieu will certainly shortly be made out.

(To be continued in January.)

Woolen Industry in China

Steady progress is being made by the native woolen industry in Tientsin, mills now in operation manufacturing nearly all products obtainable anywhere. Incidentally Hugo Stinnes the German magnate is, according to rumor, about to establish a woolen manufacturing plant there also.

Among the commodities made now by Chinese native factories are shirts, trousers, cloth, hosiery, knitting thread, scarfs, blankets, gloves, yarn, cloth rugs and carpets. About 15 mills are in operation.

The Chung Hua Co., at 160 Yung Kong Li, East Seward Road, Shanghai, manufactures woolen shirts and trousers. At Harbin, an industrial works for the poor, makes woolen cloth, hosiery and other knit goods. It has 25 woolen cloth weaving machines, knitting machines, and sewing machines. The Kai Yuen woolen and carpet factory is located at 81-83 Lan-man Hutung, Peking.

The products of the Li Hsin Textile Mill, which has its office and mill in Ningpo, are woolen scarfs, hats, etc. The Manchu-Mongol Woolen Manufacturing Co., in Mukden, is a Japanese concern with an annual output of 80,000 blankets, valued at Yen 11,000,000 and 150,000 yards of cloth, valued at Yen 850,000.

The Pu Li woolen mills are at Tsunghochen, (Chingho) on the Peking-Kalgan railway, and are operated by the board of military affairs of the Chinese army. These mills were established to make woolens for heavy winter uniforms, and goods, weighing three pounds to the yard, for overcoats, and still heavier for blankets. According to the latest report, the principal products were plain and colored felts and carpets.

Liu Cheng Li and Liang Wenchow established the Shih Hsing Woolen Weaving Co., Ltd., in Taiyuan-fu, Shansi, with woolen gloves, hosiery, etc., as its products. The Jeh Yung Woolen Manufacturing Co., of Chunkiang, Szechuan, and the Tsing Woolen Weaving Factory of Tsining, Shantung province, manufacture woolen cloth.

The Wuchai Woolen Weaving Works, at Wuchai, Shanse, manufactures blankets, scarfs, gloves, shirts and hosiery. Woolen and yarn cloth are the products of the Yu Hua Woolen Weaving Co. The China First Woolen Spinning and Weaving factory, near the Zeh Hui bridge, Shanghai, produces woolen goods of good quality. It has a special product in a kind of quilt to replace the usual cotton covering. Woolen yarns are produced by the Lung Hwa Woolen Yarn factory, Wei Yih Woolen Yarn factory and the Wei Yih Woolen Yarn Manufacturing Co. All are in Shanghai.

Volume XX

Note: The customary “Engineering and Commercial Notes” in previous volumes are published in only two of these twelve editions for 1924, the Publisher and Editor, G. B Rea instead concentrating on long political editorials and personal rants. It is no surprise that circulation was falling, taking into account that this was promoted originally as an Engineering journal. Even the advertisements were on the whole repetitive from month to month.

January 1924

William Beardmore & Co. Advertisement for Beardmore locomotives, wheels and axels.
New General Hospital for SMR Report on the construction of a new hospital in Dairen for the SMR.
Indo-China Railways 2 The second part of the history of the construction of railways in French Indo-China. This includes the Yunnan Railway in China. 1 Map.
The Sentinel Steam Rail Coach A description of these British-built steam rail cars. Although not identical, many parts were similar to those supplied to the Shanghai-Nanking Railway.
SMR Industrial Developments Short update on latest developments.
The Kowloon-Canton Railway Reported that the railway management were under criticism for making losses.
Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders.

February 1924

Chinese Railway Dreams Report on the progress (or rather “the lack thereof”) of Dr Sun Yat-sen’s national railway development scheme.
Fushun Colliery Locomotive 1 photo of an electric mine locomotive.
Baldwin Industrial Locomotives Advertisement for Baldwin locomotives. 2 small photos of engines supplied to the Liu Chang Coal mine, including the first trial run.

March 1924

A Super Extra-Territorial Government in China In a bizarre editorial G.B Rea claims his magazine is being persecuted by hidden forces working in USA and China who have destroyed his magazine’s circulation and even sued his company to the point of bankruptcy.
The Chinese Eastern Railway and Its Zone An article describing the extent of the CER’s mining and forestry reserves in north Manchuria which were being exploited by the railway.
Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders.
The Chinese Eastern Railway Advertisement for a new book entitled “North Manchuria & The Chinese Eastern Railway”

April 1924

The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.
The S.M.R. solves Japan’s Oil problem Report about the Fushun mines exploiting huge shale oil deposits which were a by-product of the mining operations.

The Chinese Eastern Railway Notes on the railway's financial and working results for 1921 and early 1922, representing a big improvement over 1920. Two photos of the CER's luxury express train.

May 1924

The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.
The Shanghai Portland Cement Works An illustrated description of the cement works including a chain operated railway. 2 photos of the railway and several of the plant.
Associated British Locomotive Manufacturers for China Advertisement for this organization representing a number of British locomotive builders.
Baldwin Six-Wheeled Switcher Advertisement by Baldwin Locomotive Works. One small photo of an 0-6-0 locomotive, No. 5 built for the Yu Fang Mining Company's iron ore mine in Anhwei.
Fairbanks Advertisement by U.S. manufacturer of railway accessories such as pipe valves, barrows and scales etc.
Berliner Maschinenbau A-G Advertisement for L. Schwartzkopff locomotives.
Motor Rail and Tram Car Company Advertisement for light railway engineering products.
The Janney-Penn Coupler Advertisement for the latest type of Janny automatic rail couplers

June 1924

Armstrong-Whitworth Advertisement for this UK. steel company, producing many products including locomotives.
The Superheater Company Advertisement for locomotive superheaters.
J.G. Brill Company Advertisement for Brill Model 55 motor railcar for short and branch steam lines.
The Status of the Chinese Eastern Railway Editorial discussing the origin of the CER, which was the product of a military "alliance" to "crush Japan", and more later international political intrigues.
Tientsin-Pukow Railway Turbo-Generating Plant Photographs and article describing a new electrical generating plant installed for the railway at Pukow by Jardine Engineering Corp.
The Peking Tramway System A description of Peking's street tramcar system. The map shows the inter-connections with Peking's main railway stations.
Baldwin Six-Wheeled Switcher Advertisement by Baldwin Locomotive Works. One small photo of an 0-6-0 locomotive, No. 5 built for the Yu Fang Mining Company's iron ore mine in Anhwei. (repeat)

July 1924

Build China's railways A long editorial by Rea discussing the case for using the unpaid portions of the "Boxer Indemnity Funds" for building railways in China. A second submission by another writer suggest that spending this money on education would be wasted.
Engineering and Industrial Notes (For the first time in several months the useful notes reappear at the end of this edition although much reduced in length and scope): -.
New Overbridge for Ssupingkai Report that the SMR was planning to build a new rail overbridge at Ssupingkai station to eliminate a level crossing.
Tsin-Pu Railway Bridge The railway had imposed a 2 cents tax on tickets to raise funds for repairing the Yellow River railway bridge at Lokou.

Tumen River Bridge A report that the Japanese had secured approval from the Chinese authorities to build a long-proposed railway bridge across the river for the Tienpaoshan-Tumen railway.
Double Gauge Goods Wagons A report that the SMT had been experimenting will dual-gauge wagons which could operate on both CER and SMR tracks of 5ft and standard gauge respectively.
Heilungkiang Railway Agreement A report that a Russian capitalist had reached an agreement with local authorities to build the "Ai-Hu" railway from Hulun (呼兰 *Hulan*) on the north bank of the Sungari to Aikiang (爱珲 *Aihun*?)
Levelling of S.M. Railway Report that the tracks in and around Liaoyang were being lowered and a new bridge constructed.
New Dairen Station Buildings Report that new large station buildings were to be built.

August 1924
Berliner Maschinenbau A-G Advertisement for L. Schwartzkopff locomotives.
The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.
Engineering and Industrial Notes:-
Railway Needs Bridges Floods had recently caused over $2 million worth of damages to the Peking-Suiyuan and Peking-Hankow railways.
Bridges on the Kiao-Tsi Railway A German company had secured an agreement to build a railway bridge at Lokow.
Steel Bridge on Kin-Han Line Tenders had been invited to build a new bridge at Sinlo.
South Manchuria Railway Electrification A scheme to electrify the entire SMR network was under consideration.
Plan Line to Chengtu The Szechuan railway officer was planning a line between Chungking and Chengtu.
Lunghai Railway Loan A report that construction of the section between Sianfu and Lanchow was to be resumed.
Harbin-Taheiho Line A Russian named Skidelski had been given permission to build this line.
Canton-Kowlung Railway the Central government had agreed that this line must be properly maintained at all costs and would provide funds.
Tai-Chi Railway Loan A report that the Pekin Syndicate would fund a loan for this railway.
Anhwei Coal Line Pu Yi Mining Co. had petitioned the government for permission to build a line from Liehahan to Fulitai.
Taonan-Khingan Railway Local authorities were planning on building this line.
Railway Planned Near Peking Military authorities in Nanyuan were planning a line to Hwangtsun.
South Manchuria Railway The latest financial report had been presented at a shareholders' meeting.
Tsotsuyao Colliery Line Located at Wafangtien, the colliery was planning on expanding a building a light railway line. Locomotives and rolling stock previously used on the Antung- Mukden light railway would be used.

September 1924
The Garratt Patent Locomotive Advertisement by the Beyer, Peacock & Company of Gorton Foundry near Manchester.
Three Cylinder Locomotive built for the South Manchuria Railway Advertisement by the American Locomotive Sales Corp. (ALCO). I photo.
William Beardmore & Co. Advertisement by a UK locomotive builder with agents in Shanghai.

(Note) The section on 'Engineering and Industrial Notes' is once again omitted from this magazine.

October 1924

Huge Shale Oil Distillation Plant for Fushun. Description of the new shale oil plant at Fushun colliery. Photos of the huge steam excavators at the open cast pits.

Dairen New Port Description of the construction of the new large harbour port at Dairen and railway connections.

Three Cylinder Locos and All-Steel Cars for the S.M.R Illustrated description of a new locomotive and passenger cars.

Antung-Wiju Steam Motor Car Line A new steam rail car serve had commenced operations across the Yalu bridge from Antung to "New Wiju" station (Sinuiju in N. Korea)

Peking-Mukden Double Tracking The M.D. of the PMR had petitioned for the construction of a new station between Yangtsun and Tientsin.

Kaiyuan-Taolu Line Tenders had been awarded for building this light rail line.

S.M.R. New Cars The Shakako workshops were building new passenger observation cars.

November 1924

Browning Company Advertisement for Browning locomotive cranes.

Railways and Tramways of Korea. Description and map of Korean railways, the main lines of which, were operated by the SMR. Numerous photos.

Lumbering in North Manchuria Description of the Russian timber concession in Manchuria and a summary of the railway lines serving them.

December 1924

The Drewry Car Company Small advertisement for Drewry rail cars & inspection trollies.

The Drewry Car Exhibit at Wembley Description of Drewry company's showroom presentation at the British Empire Exhibition.

Baldwin Steam Cars Advertisement for Baldwin steam-powered rail cars.

Railroad Equipment Advertisement for Fairbanks, Morse & Co. railway equipment.

大正七年七月十日第三種郵便物認可

P. CHIERI 1924

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

遠東時報

上海仁記路第五號

Dr. SUN AND THE CUSTOMS

P. CHIERI

THE JAPANESE EARTHQUAKE

IRRIGATION IN THE PHILIPPINES

PORT OF SABANG

TEA INDUSTRY OF JAVA

INDO-CHINA RAILWAYS

ADMINISTRATION BY ELECTRICITY

GENERAL HOSPITAL AT DAIREN

INDUSTRIAL WUSIH

Vol. XX | January, 1924 | No. 1

"MetrovicK" Motors

Overseas Branches

EUROPE		AFRICA		AUSTRALASIA	
Brussels	Copenhagen	Johannesburg	Durban	Melbourne	Sydney
Paris	Patras	Laurenco Marques	Capetown	Newcastle	Perth
The Hague	Milan	ASIA		Wellington, N.Z.	
Kristiania	Warsaw	Tokio	Kumochi	SOUTH AMERICA	
Lisbon	Bucharest	Shanghai	Bombay	Rio de Janeiro	Buenos Ayres
Madrid	Barcelona	Calcutta	Coimbatore	Valparaiso	Iquique
Berne	Constantinople	Delhi	Karachi	Lima	Weltevreden

WE have world-wide experience in the design and manufacture of Electric Motors to suit all industrial conditions and shall be pleased to give any information desired to meet specific requirements.

Let us send you our Special Publications "Individual Drive and Control of Machine Tools," B.L. 7840/2 and "Planer Drives," B.L. 7840/3. THEY CONTAIN MUCH USEFUL INFORMATION.

METROPOLITAN Vickers ELECTRICAL CO. LTD

TRAFFORD PARK - - MANCHESTER ENGLAND

THE MARK OF EFFICIENCY

Visitors To the BRITISH EMPIRE EXHIBITION are cordially invited to the STAND of The METROPOLITAN-VICKERS ELECTRICAL CO. LTD.

THE LARGEST SINGLE EXHIBIT IN THE ELECTRIC AND ALLIED ENGINEERING SECTION.

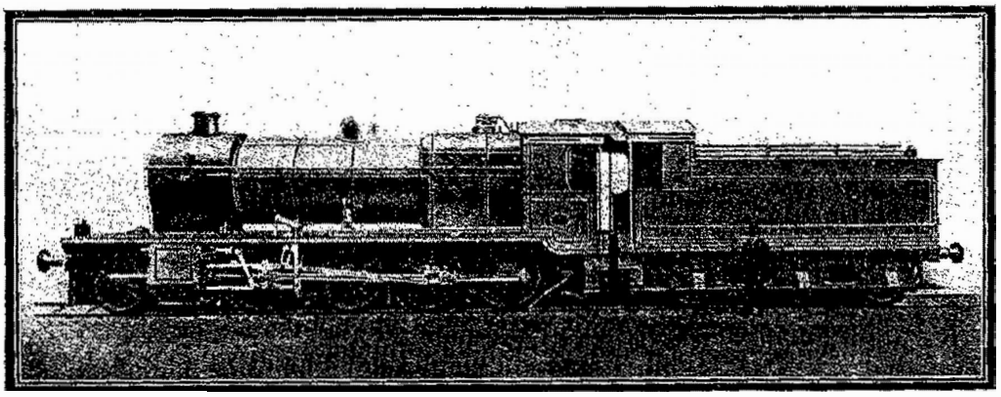
WEMBLEY LONDON APRIL 1924 AVENUES 8-10 BAYS 7-11

J. AO 4

WILLIAM BEARDMORE & CO., LTD.

BUILDERS OF LOCOMOTIVES AND ALL TYPES OF WHEELS AND AXLES

LOCOMOTIVES BUILT FOR GREAT BRITAIN, INDIA, EGYPT, Etc. Etc.



LOCOMOTIVE WORKS: DALMUIR, SCOTLAND

AS SUPPLIED TO EAST INDIAN RAILWAY

2-8-0 CONSOLIDATION TYPE SUPERHEATED

Sole Agents: **BABCOCK AND WILCOX, LIMITED**

HEAD OFFICE IN CHINA:

1 THE BUND, SHANGHAI

New General Hospital of S.M.R. Co.

Building Lessons from the Tokyo Disaster

By S.M.R. Intelligence Bureau

The Fuller Kenchiku Kabushiki Kaisha (Messrs. Geo. A. Fuller Co. of the Orient, Ltd.) who constructed the Marunouchi Building in Tokyo, have entered into a contract on a commission system with the South Manchuria Railway Company to build the new General Hospital buildings on their new site at the southeast of the Yamato Hotel, Dairen.

The total estimated cost running up to above Y.3,000,000, the award of the big contract to a foreign firm created no small stir among the Japanese builders at that time. They have naturally been following with very keen interest how the construction work has been progressing, to satisfy themselves above all as to the one question that has suggested itself to them. "Was it really worth while giving the contract to American builders?."

Then, like a bolt from the blue, the Tokyo district was visited with the worst earthquake in the annals of Japan. How the Marunouchi building has come out of it has been a focus of curiosity. For, upon this test the reputation of the great American firm has, in a sense, depended, at least to the Japanese mind.

In the indescribable confusion following the catastrophe,—earthquake and conflagration, with the loss of nearly 80,000 lives and property valued at about Y.4,000,000,000—reports were conflicting as to the damage sustained by the Marunouchi building from the seismic disturbance. The first report said it was made useless; another stated that only some of the masonry suffered; and then the truth was made known that only slight damage has been done that can be easily repaired, demonstrating that art, in this instance at least, has prevailed over nature even in her ugliest temper.

In order to bear out our vindication of the American architects concerned with the same edifice, we should be more explicit and an extract of the expert verdict on the matter, which follows, will quite suffice:

Structural Steel

The steel frame in every case seems to have been of sufficient strength to withstand the dead loads and the sudden application of any superimposed loads due to vibrations caused by the earthquake and also seems to have shown a sufficiently high elastic limit to have returned to its original position in every case. That there was undoubtedly a marked momentary deflection laterally in the columns is evidenced by the shattering of the masonry piers surrounding or enclosing the exterior wall columns, the plastered partitions between steel columns of the interior and the distortion or destruction of the steel cross bracings.

While the momentary and violent deflection of the columns laterally, particularly in the lower stories, was of sufficient strength to shatter those parts of the structure mentioned, the agitation was not sufficient to permanently distort the structural steel in any case.

Reinforced Concrete

There does not appear to be any marked or serious damage to the reenforced concrete floor slabs or beam coverings.

Where reenforced concrete walls were used on the interior there was a minimum amount of damage, except at certain points on stairway walls near the west side of the building. This damage was probably due to the lack of continuity of these walls in a straight line.

Masonry Piers

In practically all of the exterior masonry piers of the second, third, and fourth stories, there was evidence of a violent lateral motion or vibration of the entire structure; this extended in a slighter degree to the piers of the first story and the upper stories. Above the fourth story there is more or less destruction of exterior masonry, but not nearly so pronounced as in the lower stories.

There appears to be no particular kind of material outstanding as successfully resisting the crushing and, distorting effects of the lateral movement.

Hollow brick, common brick, cut stone, reenforced concrete backing, stucco, an tiles, all showed more or less instability. The relative value of these materials might be considered in an ascending scale in the order named.

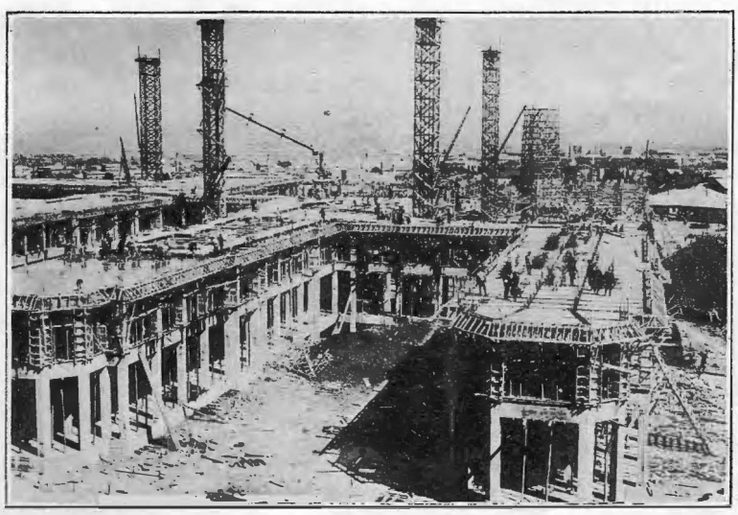
Interior Partitions

The interior partitions in general are constructed of hollow clay tiles, metal lath on steel furring, concrete or reenforced concrete all plastered on both sides. The hollow tile seems utterly unable to withstand the effect of the lateral movement of columns, as evidenced by the crushing and falling of this class of partitions where the vibration was greatest or in the lower stories. In certain locations where metal lath partitions were used there was more or less damage, but this damage was not nearly so pronounced as in the hollow clay tile partitions.

The concrete partitions behaved in a little better manner, and the reinforced concrete partitions seemed to be the best of all, but there were some cases of a shattering of these by being forced out of line by the pressure of another wall at right angles.

Marble Trim and Wainscoting

A portion of the marble finish of walls and columns in the first story was dislodged and destroyed, but as this work was done in the usually accepted manner there can be no thought of faulty workmanship.



Two views of the New General Hospital Buildings of the S.M.R. Co. at Dairen as they appeared on October 2, 1923

In Conclusion

After the San Francisco earthquake of 1906, architects and contractors held many meetings to discuss various building materials and methods of construction with a view to adopting such as seemed to be the best suited for stability. Practically all of the reconstruction work in that locality was based on designs and materials similar to or the same as those used in Tokyo in recent years, and the Tokyo buildings constructed by the Geo. A. Fuller Co. would have withstood the shocks of an earthquake of the same degree of severity as the San Francisco earthquake, with a minimum amount of damage.

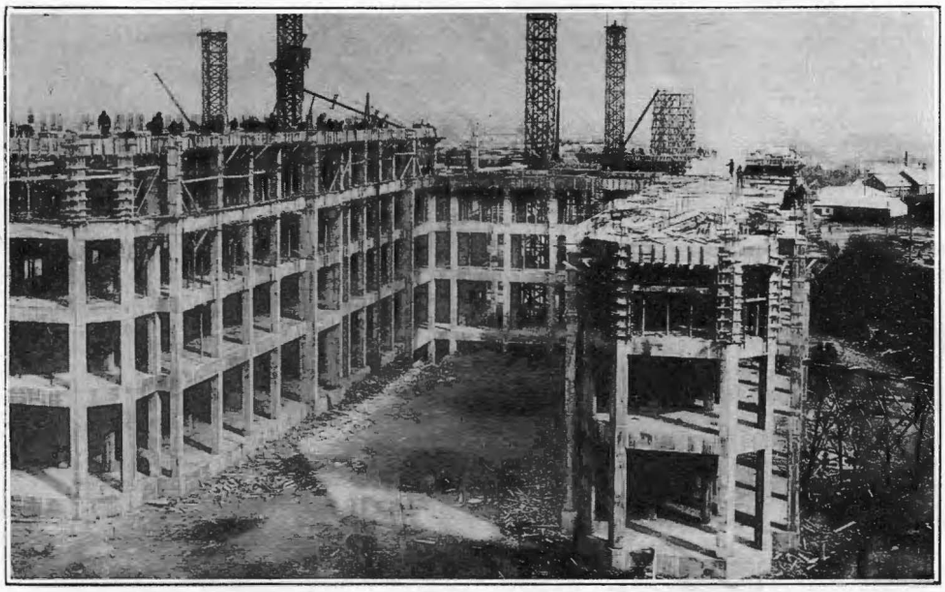
The Tokyo earthquake of 1923 was of such unprecedented severity and of such a tenacity of violence the world feel the necessity to readjust all their ideas of construction methods and to adopt such designs and take such precautions as in their belief will provide a greater measure of stability for future structures and a consequent added security for the lives of those occupying them.

Lesson Taught by Earthquake

We have reproduced at great length what damage has been done by the great earthquake to the Marunouchi bldg. (in which, by the way, the S.M.R. Co. Tokyo branch office rents a suite of rooms).

As found in the above observations, even the highest architectural authorities in Tokyo have failed to make adequate provisions for an earthquake shock of so violent a force. The recent catastrophe has served to them as an eye-opener, for they, too, have seen the necessity to "readjust their ideas of construction methods and to adopt such designs and take such precautions as are calculated to provide a greater measure of stability for future structures."

Just what shape the recommendations of these authorities may take must be of profound interest, and we shall now proceed to give them in brief, item after item.



The right wing of the New Hospital as it appeared on November 1, 1923

Foundations

A close observa-tion of the effects of the recent earthquake in Tokyo induces the belief that all foundations should be of friction piles capped with reinforced concrete, isolated pier spread footings, or a solid concrete mat without piles.

In the case of friction piles a number of test piles should be driven of different lengths and in several locations on the lot, each pile tested as to its bearing capacity and each foundation computed from the data thus obtained, allowing a safety factor of six or seven. In no case should the piles be driven to hard pan or to refusal. Each cluster of piles should be capped with reinforced concrete and these caps connected at the top in each direction with reinforced concrete struts.

In the case of isolated pier spread footings load tests should be taken in several parts of the lot at the proposed level of the footings and the size of each footing computed from the data thus obtained, allowing a safety factor of at least five. These footings should be connected in each direction with reinorced concrete struts.

In computing the loads to be carried by either the pile-footings or the isolated pier spread footings, only the actual dead load of the structure should be used. No live load should be figured, or at the least only a very small percentage. Care should also be taken to have the bottoms of all footings at the same level, and deep 'base ments should be avoided.

In the case of a solid concrete mat foundation the mat should be of sufficient thickness and figured for reinforcement to withstand the actual pressure on the ground as determined by computation of dead loads, and should project sufficiently beyond the outside columns to avoid eccentric loading.

The above recommendations are based on a belief that the soil underlying Tokyo will act as a sort of shock absorber, as evidenced by the behavior of such buildings as the Seiyukai building, the Imperial Hotel, and several other office buildings in Marunouchi, Tokyo.

If the foundations or the piling under them are of such length as to reach a solid stratum, then the full severity of the earthquake shock is transmitted through the foundations to the entire structure, while, if the foundations rest on a soil of somewhat resilient nature, the transmission of shock will be very much less.

Structural Steel

Columns should be placed in straight lines in each direction so that at every panel there will be a maximum number of points of resistance. The sections of the columns should be as wide as possible in each direction and should be connected at each floor by girders as deep as the requirements for head room will permit. Both columns and girders should be latticed if the computation of stresses does not require solid web plates. If solid webs are required, then the webs should be punched at frequent intervals to permit of the proper application of reinforcing steel as will be touched upon later. Between the girders at each floor will be the necessary steel beams for carrying the reinforced concrete floor slabs.

In cases where head room or clear interior spaces are absolutely necessary, then resort must be had to knee braces. It is recommended, however, that such rooms as absolutely require great height or clear interior be placed on the top story or as near thereto as possible. Rivets for connection of girders to columns should be in shear, wherever possible. Rivets in tension should be studiously avoided.

Reinforced Concrete

In all cases, the specification for the mixture for reinforced concrete should be made after a study of the screen analysis of the coarse and fine aggregates available for use. No assurance of success can be had by the adoption of arbitrary proportions for the materials to be used. The water content should also be carefully considered and only a sufficient amount of water used to enable the practical working of the concrete into the forms.

Exterior piers around steel columns should be of reinforced concrete and as large as possible, extending from the frames of openings on each side and from the heads of window frames below to the sills of window frames above.

Interior columns and connecting girders should be entirely covered with concrete, thoroughly reinforced around and through the columns and longitudinally.

Build solid reinforced concrete walls wherever possible between columns in the interior and also around such places as elevator shafts, stair wells, pipe shafts, and vent shafts.

Wherever possible build solid reinforced concrete walls from basement to roof and from outside to outside walls of building, leaving only such openings as are absolutely necessary for ingress and egress and reinforce the perimeters of such openings in a thorough manner.

Exterior Facing

Avoid the use of brick or stone veneer, if possible, using only stucco work or thin tiles and forming the outlines of projecting cornices, belt courses, etc., as largely as possible in reinforced concrete.

Partitions

If impracticable to use reinforced concrete partitions, the next best in the order named are metal lath on steel studs solid brick, hollow brick, hollow clay tie. Reinforced concrete is, of course, recommended because of the additional stiffness thereby awarded to the structure as a whole, but if this seems impracticable, then use metal lath.

Lighting Fixtures

Lighting fixtures should be either in direct system secured flat against the ceiling or should have stiff suspension.

Marble

Use a minimum amount of marble slabs if the marble is to be attached to walls or columns.

Qualifications as Architects

Above, the damage done to the Marunouchi bldg., Tokyo, by the recent earthquake, has been described, together with the expert opinions as to what new provisions should be made in regard to future structures to render them as immune to earthquake shocks as humanly possible at the present stage of progress of science.

A competent architect will readily be satisfied of the intrinsic value of the skill and experience displayed in concrete form in the construction of the Marunouchi bldg. Especially, there are cases for comparison in plenty. Far from us to extol the builders of the Marunouchi bldg. from an inspired motive. There are the plan facts of how the same Edifice has weathered the terrible shock. Besides, the lesson the earthquake has taught has already been set forth in black and white. The newest knowledge just acquired is certain to be made use of in the erection of the General Hospital, Dairen.

All the building materials were hauled to the site of the New S.M.C. Hospital by electricity. This view was taken on November, 1923.

Very likely, the San Francisco earthquake has given many valuable hints to the construction experts now interested in the new hospital buildings. These hints must have guided them in the erection of the Marunouchi bldg., and now they are made doubly wiser through the severer earthquake about Tokyo.

People may say Manchuria has been free from seismic disturbances, and no such pains as is necessary to be taken in Japan is demanded in putting up a new building in Dairen. They might even add that adequate provisions against possible earthquake do not make a strong recommendation for construction work in Manchuria. Being a perfect stranger to what risk there exists for Manchuria to be visited with a strong earthquake sufficient to cause a devastation as terrible as those of San Francisco and Tokyo, we might agree to the above contention. However, the recent disaster being entirely unexpected, the good precaution provided against such a calamity may readily imply that in other respects, too, such as durability, resisting power, etc., provisions have also been made to a degree above reproof.

We may add in this connection that the plans in the cases of the Marunouchi bldg. and the General Hospital, Dairen, have been drafted by Japanese architects and Messrs. Fullers have followed these plans in construction.

How Far Construction Work has Progressed at Dairen

The ground comprises 960,000 sq. ft. The progress of construction made so far (November, 1923) may be called 45 per cent. of the whole; in point of money, 30 per cent. has been laid out; and as to time, some 38 per cent. has been passed. In structural frame, the fourth floor has been completed all round, and the columns supporting the fifth floor are now receiving attention.

The labor gang is composed of about 900 Chinese recruited through the local labor-keepers. They are under Japanese foremen, through whom only the Chinese are employed. This principle is seldom departed from. However, the Chinese include also skilled workmen such as carpenters, blacksmiths, stone masons, concrete mixers, etc.

At the outset, what means of transporting building materials should be adopted was debated upon. The relative merit of carts, motor trucks, and a railway siding was studied. An approximate total of the weight of all building materials was computed. If carts were to be used, 120,000 cartloads would have to be carried in, and as many as 600 cars might have to be jammed into the compound at a time on occasion. Besides, the tear and wear to the city roads would be frightful. This idea was plainly untenable. The idea of using motor trucks appealed as little. For, twenty or so of them would be required, and they would be constantly subject to damage, not to mention the inconvenience in loading and unloading. The final choice settled upon a railway siding, and the work of laying one from the eastern circle at the entrance to the railway wharf compound was started on March 31, only a day or two later than the day on which the ground was consecrated by the Shinto rite in the presence of Mr. T. Onogi, then chief architect of the S.M.R. Co., and Mr. W. S. Sample, general manager of construction of the American firm, who had come to Dairen on December 24, 1922, almost direct from America, etc. He had merely touched at Yokohama and Tokyo on the way.

The first train load of materials arrived in the ground on June 6.

The grading work and excavation had been commenced on April 10 and were finished on July 27. The first concrete had been laid for the foundation on May 2. The geological structure of the building site was of rocky character, which is good enough for ballast in road building, but too soft for concrete. The rather brittle nature of the rocky stratum made it an elusive article for the drills to handle, but the inconvenience felt on this score was only nominal.

Granite is obtained from a point at about 4 miles from Hsiungyocheng (famous for its hot springs). It is carried down south by railway as far as goods platform No. 2 close to the tram car sheds, Dairen, and then switched off into the temporary construction siding, to be brought past the war memorial and around the pond and the girls' high school, right into the ground. Ballast is brought either from Kochenpu, between Choushuitzu and Nankuanling, to which a siding runs from the main line, or from Hoshigaura. In the former case, the same route of conveyance as granite is taken.

With the latter, goods tram cars are used as far as below the West Honganji Temple, where the new temporary siding meets near the official residence of the commissioner of customs. Sand is carried from Shihho, a wayside station north of Chinchou. Cement is had from the Onoda Cement Factory, Choushuitzu, and bricks (tapestry brick, common brick, and partition tiles) are obtained from the Yingkou Brick Kiln, Choushuitzu. Lumber comes all the way from Changchun.

As work advances, window frames, door frames, glass, paint, lime, plaster, etc., will be procured from local or Japanese sources. The only articles for import from the United States will be reinforcing steel bars, boilers, hardware, and plumbing fixtures.

We have shown what care has been taken to let the Japanese see that, in both talent and material, the Japanese resources are drawn upon as far as possible.

The Chinese coolies are paid twice a month through their respective foremen, and a number of them are quartered in the sheds put up in the ground.

As to the construction siding, when the building work has been finished, it will be included in the city tram service. Although the rails are laid for railway trains, they are good also for electric tram traffic, the gauge being the same. Only the siding will be available for no goods cars above 30 tons each in carrying capacity.

The most interesting shop to a Japanese is of course the stone masons' shed, equipped with ten stone working machines imported from America not long ago. The men wear goggles while working one of them. Pieces of granite are carried into the shed by light rail right underneath one of the machines, which can cut, carve, and polish by the change of the tool alone. Even when only a few of them are being operated, the shed will be found full of clouds of white dust rising from the machines. They give, as may be expected, dinning noises.

A wholesome sign of industry and discipline will impress a visitor in the ground. Few coolies retain the customary easy going air about them. Every fellow is at work, plainly showing that he really means business and takes a keen personal interest in what ever work is assigned to him.

Firm's Main Office, Dairen

Turning to the management of the Oriental department of the famous American builders, Mr. James Lee Kauffmann serves as managing-director at Tokyo. Through his preliminaries, the firm has obtained the General Hospital contract from the S.M.R. Co. Unless something unforeseen turns up or extra work is undertaken, the total construction estimate is thought unlikely to exceed Y.3,000,000. The commission, to which the firm is entitled, is said to be at 13.5 per cent., as against 15 per cent. secured for the Marunouchi bldg., Tokyo. The firm now keeps its main office at Dairen, with Mr. Wilbur S. Sample and Mr. J. I. Traphagen for joint managers.

What the Huge Edifice is Like

The gigantic edifice will face on the north. The main building, which is for the administration is 52 metres (from east to west) by 16 metres (north to south). It is six-storeyed and has a wing projecting in a straight line at each end, southward and northward, leaving a front yard embraced by the wings, each 3 storeys high. The western wing is for consultations for the different divisions, of which there are nine—Interclinique, surgery, ophthalmology, rhino-laryngo-otology, dermatology, gynecology and obsterics, dental surgery, psychiatry and bacteriology. The eastern wing is for library, auditorium and archives. There arc two other wings to the main building extending symmetrically westward and eastward, each being five storeyed. The one belongs to the Surgical department and contains operating room, class rooms for nurses, etc. The other wing contains rooms for X-ray and genealogical treatments, and functional examination.

The main building leads rearward by a covered corridor to the rooms for special treatments of the same length and width with, and parallel to, the main building. Rooms for gymnastic, electric, and hydrotherapuetic treatments, and massages of different kinds, pharmacy, and laboratory are found therein. It has a wing extending each 66 m. in length westward and eastward, 11 m. wide. These are sickwards. They have each another ward a little distance in the rear, running parallel thereto. They are also wards. The extremities of the four wards, all four storeyed, are Solariums or sun parlours, novel acquisitions to Dairen.

Both the main (administration) and the Speal treatment roomshaveeach a basement, and therein sterilizing-, store-, motor-, fan-, air-conditioning-, and cold storage-rooms, besides dispensary, laundry, refrigeratory, and lunch rooms are contained. The fans are for ventilating purposes and take the form of squirrel cage blowers. Another new feature is the air-conditioning, by which means the air in any particular part of the building may be dried, humidified, or purified.

The power house is to be built separately, but is not included in the contract, although there is a good chance of its being added thereto later, with the Mortuary which will be located in the most obscure corner. We understand that heating is to be effected by steam and by means of wall radiators or electric thermastadts.

New Yarrow Steamer for the Upper Yangtze

Yarrow & Company, Ltd. of Glasgow have secured an order for a large shallow draft river steamer for the Anglo-Saxon Petroleum Co., for service on that part of the Yangtze Kiang that lies between Ichang and Chungking where the navigation is rendered both difficult and dangerous by the many whirlpools and rapids that have to be encountered.

The vessel which will be of the Yarrow type is specially designed for this service for carrying oil fuel in bulk. The propelling machinery will consist of two sets of triple-expansion engines developing a total power of about 3,000, steam being supplied by two of the latest type of Yarrow patent water-tube boilers suitable for oil burning.

The design of this steamer will follow very closely the large number of river gunboats Yarrow & Co., Ltd. built for the British admiralty during the war, the whole flotilla of which was designed and built by them and for which they took the responsibility.

* * *

Japan Notes

The Japan Steel Tube Company, (Nihon Kokan K. K.), Tokyo, was operated at one-half of its capacity during November. The loss of the company arising from the disaster is reported to have amounted to Y.500,000 in round figures. It is also said that the company can make dividends on its preferred shares only.

* * *

The Kinugawa Hydro-electric Power Company supplied 35,700 k.w. during November, 1923, two-thirds of its total capacity. September, it supplied one-third of its entire capacity and in October, one-half. One of its 6,000 k.w. steam generators in Tokyo has been destroyed by the earthquake, and a budget of Y.119,000 has been approved for its renewal. The business of the company has been greatly improved by the revision of contract with the Tokyo municipality.

* * *

The Uraga Dockyard Company (Uraga Senkyo K. K.) decided to reduce its authorized capital of Y.10,000,000 to Y.7,000,000 at its general meeting in November last for the purpose of making up the loss of Y.4,000,000 caused by the earthquake. The decision, however, was not authorized as the number of attendance at the meeting was short of the legal number.

* * *

The Tokyo Gas Company loan of Y.3,000,000 has been guaranteed by the Dai Ichi, Jugo and the Mitsubishi Banks for restoration funds. It is reported that these three banks will get more funds for the company.

* * *

The establishment of the Sangu Electric Railway Company, which proposes to connect the cities of Nagoya and Uji-Yamada by a high speed electric railway was effected at the meeting held under auspices of the Toho Electric Power Company, mayors of Yamada, Tsu & Yokkaichi, in November last, with a capital of Y.1,000,000, (200,000 shares). Of the total number of shares, 130,000 will be taken by the Toho Electric Power Company, and its allied companies, while the rest, amounting to 70,000, will be sold to the public in Mie prefecture.

Indo-China Railways—2

Working Lines

Continued from December issue, page 745

TOPOGRAPHICAL DETAILS

THERE are 1,293 miles of railway in the union as shewn in the table below.

The first three group are run by the colony and the fourth by a private company.

I.—Northern Group

1. HANOI TO NAM-KWAN

This line after leaving Hanoï crosses the Red River by a steel bridge, 1 mile and 77 yards long and runs through the paddy fields of the densely populated Tonkin delta by Bac-Ninh, Thi-Cau and Phu-Lang-Thuong to Kep (85 miles).

From Kep to Bac-Le the line follows the Song-Thuong river through a wooded and sparsely inhabited district.

From Bac-Le to Jiai it continues to follow the same valley, here much wider and more cultivated, between low bare hills on the east and the rocky mountains of Kai-Kinh on the west.

From Lang-Jiai the line takes on the character of a mountain railway and climbs through a wild and bare region to close to Langson where it enters the basin of the Song-Ki-Kung, a tributary of the Si-Kiang or Canton-river.

The last portion of the line runs through an easy and fairly rich and populated district.

The Cholen Station on the Saigon-Mytho Railway

Finally from Dong-Dang (3 miles before Nam-Kwan) a branch, 8 miles long, opened on November 15, 1921, runs to Na-Sham situated on a navigable reach of the Song-Ki-Kung. This branch is distinctly more important than that to Nam-Kwan and may be looked upon as the mainline.

	Railways	Portions open to Traffic	Length miles	Remarks
I	Northern Group ..	Hanoi to Na-Sham, 114 miles Hanoi to Vinh, 202 miles	317	
II	Central Annam Group ..	Turan to Hue, Kwangtri and Dong-Ha	109	
III	Southern Group ..	Saigon to Mytho, 43 miles Saigon to Nha-trang, 290 miles	333	
IV	Cie Fse des Chemins de fer de l'Indo-Chine et du Yunnan ..	Haiphong to Lao-kai and Yunnan-fu	534	of which 289 miles are in China, north of Lao-kai

2. FROM HANOI TO VINH

From Hanoï this line crosses the delta of the Red River by the native towns of Phu-Li, Nam-Dinh and Ninh-Binh and reaches the Tonkin frontier at Bim-Son, 88 miles away.

At 109 miles it reaches Thanh-Hoa the capital of the province of the same name and still in a delta country, whence, following the coast, it runs into the delta of the Song-Ka and reaches Vinh, 199 miles from Hanoï.

The whole of the district through which this line runs, with the exception of between Ninh-Binh and Thanh-Hoa, is composed of the deltas of the Red River, the Song-Ma (Thanh-Hoa) and other small rivers and the Song-Ka (Vinh). It is a great rice-growing country peopled by Annamites and on the whole fairly prosperous, and is even remarkably so in the Tonkin section. As may be expected the line is pretty level.

The present terminus at Vinh is also connected by a 3-mile branch running along the river to the port of Ben-thui on the estuary of the Song-Ka. This port may become some day of importance when the proposed roads and railways connecting it with Laos and the plateau of Tran-Ninh have been materialized.

II.—Central Annam Group

The one and only railway in this group runs from Turan, the chief port of Central Annam, by the royal city of Hue (64 miles) and the capital of the province, Kwang-tri (99 miles), to its present terminus et Dong-Ha (109 miles from Turan).

Topographically it may be divided into two distinct sections. The first, up to 31 miles from Turan runs through a hilly and sparsely populated region where the line is very devious and abounds in constructive works. In the second section the line passes through or near level country by the sea which, without attaining the prosperity of the rich lands of Cochin-China or of the Tonkin delta, is yet fairly well populated.

III.—Southern Group

1. SAÏGON TO MYTHO AND CHOLON

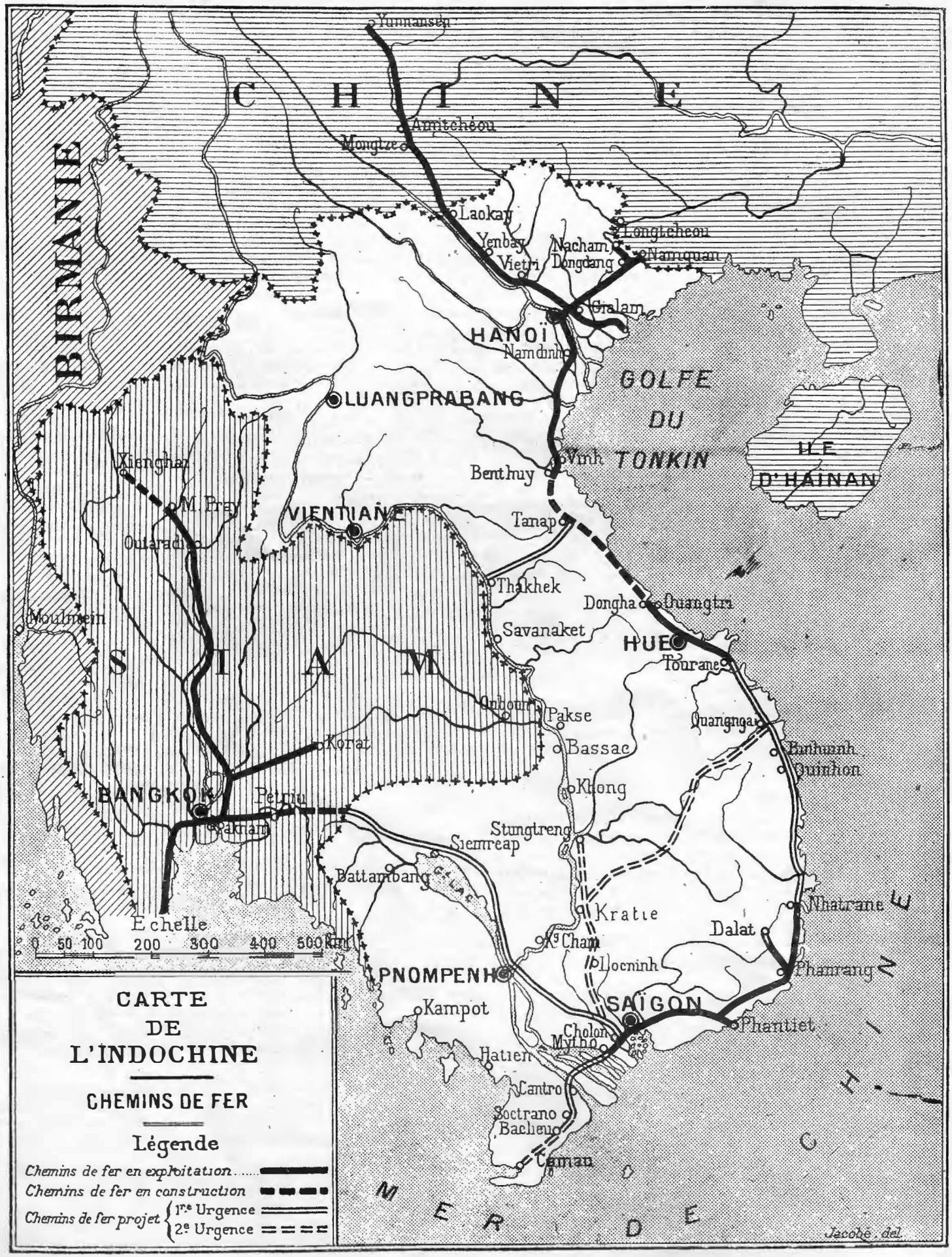
This railway, running through a populous part of Cochin-China, linking up two important towns and finally passing through the Chinese city of Cholon, has by far the most dense traffic of all the railways of the colony.

As it crosses a country cut up by large rivers it contains important metallic structures, built under difficult conditions owing to the nature of the ground.

2. SAÏGON TO NHA-TRANG

From Saïgon this railway runs up the valley of the Saïgon river, which it crosses at Bien-Hoa, through a fertile and well populated level country. Soon after leaving Bien-Hoa it runs over the low but densely wooded spurs from the Annamite mountain-chain, and approaches the coast at Muong-Man, from whence runs a branch to Phantiet, a fishing port and trade centre on the delta of a small river. Thence it follows the coast cutting the mountain spurs separating the valleys of the little coastal rivers, past Phan-ri, Phan-rang (station for Tur-sham) and Kam-Ranh to Nhatrang.

From Tur-Sham a branch, of which 25 miles are already constructed, runs to Krong-Pha and will be prolonged up to the Langbian plateau.


CARTE
DE
L'INDOCHINE
CHEMINS DE FER
Légende
Chemins de fer en exploitation
Chemins de fer en construction
Chemins de fer projet
1re Urgence
2e Urgence
Echelle
0 50 100 200 300 400 500 Km
CHINE
BIRMANIE
SIAM
GOLFE DU TONKIN
ILE D'HAINAN
MER DE CHINE
Yunnansen
Amitchéou
Mongtze
Laokay
Yenbay
Vietri
Nacham
Dongdang
Longtcheou
Namquan
Gialam
HANOÏ
Namdinh
LUANGPRABANG
Vinh
Benthuy
Tanap
VIENTIANE
Xienghai
M. Pray
Outaradia
Thakhek
Dongha
Quangtri
Savanaket
HUE
Tourane
Moulmein
Onboun
Pakse
Bassac
Quangngai
Binhuinh
Quinhon
Korat
BANGKOK
Petriu
Pakham
Khong
Stungtreng
Siemreap
Battambang
Kratie
Nhatrane
Dalat
Kg Cham
Locninh
Phanrang
PNOMPENH
SAÏGON
Phantiet
Kampot
Cholon
Mytho
Hatien
Cantro
Soctrano
Bachieu
Camau
Jacobé del.

The whole district from Bien-Hoa, including the deltas, is barren. Irrigation works, plans for some of which are already being made, utilization of the forests and increase in the rubber plantations will alone make this line pay sometime in the future.

The lay-out of the line presented no serious difficulty as the spurs of the Annamite mountains could be crossed by easy gradients.

IV.—The Yunnan Railway

This railway which runs from Hai-phong, the great port of Tonkin, for 534 miles to the capital of the Chinese province of Yunnan may be topographically divided into four parts:

The delta of Tonkin,

The valley of the Red River,

The valley of the Nam-Ti, and the Yunnan plateau.

The delta of Tonkin, which is crossed from Hai-phong to Vietri has the characteristics already indicated, viz; an agricultural country, densely populated and rich. The line runs by the towns of Hai-duong and Jialam (61 miles) where the trains coming from Hai-phong branch off to Hanoï, jointly utilizing for 2½ miles the metals of the Hanoï and Nam-Kwang line; from Jialam it runs on to Vietri (102 miles).

From Vietri to Lao-kai (242 miles) by Yen-Bai the railway follows fairly closely but without difficulty the windings of the Red River along a narrow and sparsely inhabited valley.

From Lao-kai to the pass of Milati the rails, now in Chinese territory, run up the valley of the Nam-Ti, a tributary of the Red River, and crossing the pass (339 miles) at a height of 5,577 feet attain the Yunnan plateau. The whole region is wild and unhealthy, and the building of the railway was exceedingly difficult owing to this and to the nature of the soil.

The Station at Mytho

From the pass the line descends by a gradient averaging 1 in 62 to the important station of Pi-che-shai (352 miles) in the Mong-tzu district with its tin mines at Ko-Kiu. Soon after passing A-mi-chu (379 miles) it enters the valley of the Pa-ta-ho and runs up it to Yi-liang.

From this town the railway rises rapidly by an average gradient of 1 in 40 to Shue-Tang (480 miles) where it reaches the upper Yunnan plateau, whence, through an almost level country, it reaches its terminus at Yunnan-fu (530 miles).

This last section—more especially close to Yunnan-fu—runs through a generally fertile and populous country thus assuring an important traffic.

II.—Constructional Details

1. Earthworks, Etc

The gauge of the Indo-Chinese railways is 1 metre (3-ft. 3⅜-ins). This is considered more than sufficient to meet all possible traffic requirements for many years to come.

Gradients never exceed 1 in 40 and the radii of the curves are never less than 100 metres (5 chains).

2. Permanent Way

A. *Rails.*—The steel Vignole rails are laid on broken stone ballast 19⅝-in. thick and 8-ft. 2½-in. wide on top. They are from 26-ft. 3-in. to 39-ft. 4-in. in length and weigh, according to type, from 13.4 to 18.1-lb. per foot run.

Fish-plates.—The fish-plates, generally of a current type and weighing from 12.1 to 13.2-lb., are attached to the rail by 4 bolts in a single row.

Sleepers.—These are of metal on the Yunnan line and on part of the other railways, and have given entire satisfaction. It is too soon, however, to fix the length of their life.

In the other parts of the colony, and especially in the forest regions, the sleepers are of wood as their first cost is much lower. They are cut from Lim, nghien and sao trees and are generally 5-ft. 8⅞-in. by 7-in. by 4¾-in. and spaced fairly close together. The rails are coachscrewed direct on to them without any sole-plates.

Signals. The Lines are all single and the traffic easy, so that signals and signal regulations—of the usual French type—are minimum.

B. *Buildings.*—The smaller stations are provided with but one building for both passengers and goods, and the line is doubled and has a lay-by siding as well. The more important stations are provided with various types of buildings.

Over the greater part of the railways there has been no difficulty in supplying water, which has to be nearly always pumped.

C. *Gatekeeper's* lodges and living-quarters for staff outside towns and villages there are but few busy roads to be crossed on the level and therefore there has been little need to provide gatekeeper's houses. On the other hand many stations have special quarters for Europeans and for natives.

D. *Fencing.*—This is provided solely in the stations and in certain towns and villages, all the rest of the line being left open.

Equipment

Rolling Stock*

1. *Locomotives.*—The most usual type of locomotive is a 4-wheel coupled weighing empty about 30 tons (1 ton × .984 tons), and capable of hauling 200-ton passenger trains at 25 miles an hour or 300-ton goods trains at 12 to 16 miles an hour.

More powerful locomotives—8-wheel coupled and 40 tonnes adhesion—are used on the long 1-in. 40 gradients of the Yunnan railway.

The proposed Langbian railway will be worked partly by adherence and partly by rack.

Coal is exclusively employed in Tonkin and Yunnan, where this combustible extracted locally, is cheap (from $10 to $15 per ton according to quality). This is supplied chiefly from the collieries of Hongay (a non-bituminous coal), of Phan-Me, in the Thai-Nguyen district, and of Phu-Nho-Kwan to the west of Ninh-Binh. These two latter produce a good bituminous coal.

The Central Annam and southern groups having to obtain their coal from Tonkin, use wood as well, as it is cheaper. The only coal that Tonkin exports is in the form of briquettes from Hongai which cost in September, 1921 $30 per ton delivered at Saïgon, and about $27 at Turan, whereas wood was from $3 to $4.50 per ton.

2. *Passenger Stock.*—With the exception of the Saïgon and Mytho line there are four classes; first and second-class are generally combined to form a mixed carriage, but the most usual type—known as A.B.C.—has 2 first-class, 2 second-class and 4 third-class compartments. There are of the corridor type with seats running across the carriage. There are a few carriages entirely third-class. All the above are used by both Europeans and natives.

*The rolling-stock of the colony is fairly homogenous at the present time, except on the Saigon and Mytho railway, which is of much older construction and where the loading gauge is smaller, the curves of smaller radius and the constructive works built for lighter loads. It therefore has special material, and locomotives and trucks weighing empty over 5 tons from the other railways cannot be run over its lines.

The fourth-class is reserved for the latter and the carriages have seats along the two sides, the centre being free for luggage, such not being carried in the van.

All passenger stock runs on bogies and weigh each about 16 tons.

3. *Goods Stock.*—This is all of the type usual on metre gauge railways and calls for no special remark.

4. *Fixed Works.*—This too calls for no special remark, each group being fitted up on normal lines.

5. *Repair Shops.*—The colonial railways have shops for erecting and repairing, but not for construction, as all metal parts are received from Europe as a rule fully machined. Joinery and body-work, however, is done in the colony.

List of repair shops.

Group	Chief Repair-shop	Branch Repair-shops	Remarks
Northern	Truong-Thi (1)	Hanoi	(1) 1 mile from Vinh towards Benthuy.
Central Annam ..	Turan	Hue	
Southern	Dian (2)	Saigon	(2) Between Saigon and Bien-Hoa.
Yunnan	Jia-Lam	Lao-kai-Amichiou Yunnansen	

Management

1. Colonial Railways

Each of the three sections is under a chief sectional engineer and forms a distinct management under the engineer-in-chief, who is directly under the orders of the inspector-general of public works in Indo-China.

A small staff of French directs the native station-masters, inspectors, trainmen, engine drivers, shop workmen, etc.

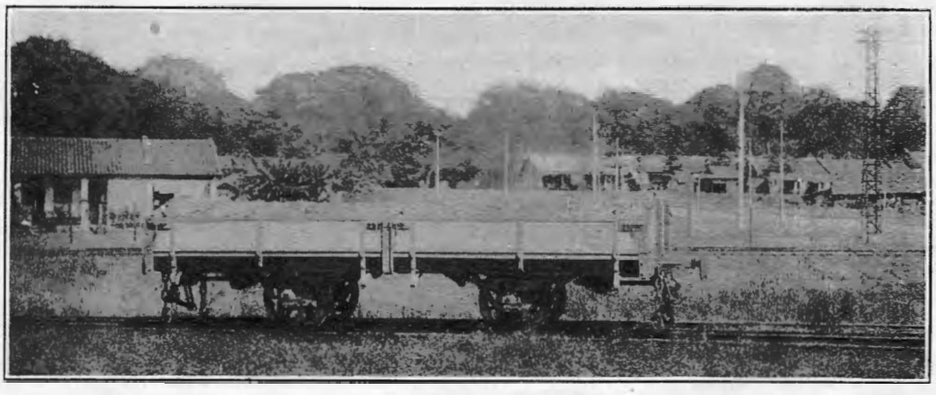
The finances of the railways are governed by the interministerial order of February 17, 1914 and are as follows :

Every year a railway budget is established outside the normal budget. Its sole receipts are those that it earns.

Besides this, three funds—also outside the normal budget—have been created :

1. A rolling fund consisting of materials and money sufficient to meet the current requirements of the running department. This forms a stores department, everything being obtained through it.

2. A special fund for supplementary works and supplies, out of which are met the cost of all new or extraordinary work, such as renewals and improvements.



Types of Rolling Stock on the Saigon-Mytho Line

Tramway Station at Govap, Cochin-China

3. A reserve fund to cover the deficit in receipts in bad years.

These three funds were created at the start by loans from the reserve fund of the general budget. In normal years this system works as follows : the reserve fund remains untouched ; the stores department, whose payments are all in cash, keeps a stock of stores and money of practically unvarying value while the special fund, out of which extraordinary expenses have been met during the year, is fed by a portion of the year's receipts, the other portion going to the reserve fund.

2. Yunnan Private Railway

The management of this line does not essentially differ from that of the colony's own lines, natives being employed as far as possible under the guidance of a few Europeans.

Its finances are regulated by an amendment to the agreement dated July, 1920, whereby the colony undertakes to re-imburse all expenses incurred by the Company for improvements in the maintenance and running of the railway. Before the application of this amendment, which is of five years' duration, the Company's expenses were covered by a system of fixed charges, but this had to be abandoned on account of the varying economic values due to the war. It will probably be re-established at the expiration of the present system, but naturally in a form to meet existing economic conditions.

In both cases, by fixed charge or by direct re-imbursement of expenses incurred, all net running receipts are devoted, first, to meeting certain of the Company's expenses (capital charges and expenses of the central management, etc.) and secondly, what is over divided between the colony and the Company in accordance with the terms of the concession.

Traffic Results

Each year the inspector-general of public works of the Colony issues statistics showing how the railways have been run, the nature of the traffic, etc., from which the following notes on the special trade of Indo-China have been taken.

1. Passenger Traffic

Local Character of Native Travel

As will be seen from the figures given later on, native passenger traffic forms an important item in the receipts.

With the exception of the portion of the Yunnan railway in Chinese territory, the only railways that cover their expenses are those in the deltas of Tonkin, Northern Annam and Cochin-China. These districts are peopled uniquely by Annamites, living for the most part on the cultivation of rice and a few home industries, but generally without commercial instinct.

This extremely dense population (over 777 to the square mile in certain districts) quickly took to the railway and forms actually, a very important class of passenger, but the Annamite, like most peasants, sticks to his native village. It is exceedingly difficult to make him leave his delta for higher districts or to get him to undertake any sort of work, whether trade, industry, husbandry or public works outside his chosen home. He takes the train, therefore, solely to go to market in the nearest town or village where he sells his produce and purchases a few indispensible necessaries, and very rarely undertakes a long journey.

2. Traffic in Local Produce and Goods of Current Consumption

For these same reasons and because the produce of each delta, on which the Annamite is contented to live, is practically the same, there are very few long hauls of goods on the railways.

3. Goods for Export. Competition of Water-Carriage

Sometimes, however, there is a fairly considerable surplus of rice for exportation. The exportation of wood is also well developed.

But the handling of these goods as well as of coal, lime, cement, bricks, etc., is much more cheaply undertaken by water (rivers and sea) and seeing that the railways, as is usual in new countries, generally follow a river or the coast, such competition is fatal to them.

4. Imported Goods

These are handled by the railways, but their volume is still very small as may be expected where industry is just beginning and local customers are not exacting as regards foreign goods. The importance of the traffic to Yunnan in metal goods and in cotton tissues may, however, be noted.

The above reasons suffice to explain the local character of the traffic and the absence so far of long hauls such as might have been reasonably expected. These latter are, however, quite, within the bounds of possibility after the railways have been extended and have placed new and suitable countries within reach of the Annamite population and when industrial enterprises have multiplied. It is quite conceivable, too, that the drainage works of Cochin-China will in due time increase the available land for culture and that the Trans-Indo-China railway, when completed, will bring abundent labour from the less favoured lands in the north.

The Annamite dreads voyages by sea more than those by land, and it is more than likely that, when the population eventually make up their minds to undertake long journeys, the railways will have the preference.

Traffic Statistics

Passengers

In 1920 the railways of the Colony transported 11,500,000 passengers, including 10,900,000 natives, the receipts for which were 5,000,000 piastres, half of which was received from the natives. These figures have been steadily increasing since 1915, when the existing railway system was practically completed.

The following stations show remarkable annual returns for a colonial railway: Hanoï with 2,660,000 passengers vielding $428,000; Haï-phong with 800,000 and $106,000 Saïgon with 642,000 and $193,000; Hai-duong with 619,000 and $40,000; Yunnan-fu with 593.000 and $70,500 and Mytho with 350,000 passengers and $157,000 of receipts.

Goods

In 1920 767,000 tonnes of goods were transported bringing in $2,830,000.

The most important goods stations are: Hanoï with 175,000 tons yielding $352,000; Hai-duong with 72,000 and $346,776; Saïgon with 123,000 and $100,000*; Yunnan-fu with 49,000 tons and $259,172 of receipts.

The only goods calling for remark are metal goods and textile tissues on the Yunnan railway, which yield respectively $248,000 and $237,000.

* Saigon is placed low in the list of important stations as all the richest lands near-by and in the hinterland of Cochin-China are connected to it by many excellent waterways, but in few cases by rail.

Running of the Trains

As a rule the commercial speed of passenger trains rarely exceeds 15 to 17 miles per hour, and that of mixed trains is about the same, while goods trains travel at about 12 miles per hour.

With the exception of the service between Saïgon and the sanatorium of Langbian and of a daily train between Hai-phong and Hanoï (from 7 to 10 p.m.) all trains run only during the day.

Railway Finances

The total capital invested by the colony in its railways is:

In the railways run by the colony	...	...	182,582,973 francs
In the Yunnan private railway	...	...	243,068,423 —

The curves given in the appendix show, for the period from 1915 to 1920 inclusive, the general results of the running, the receipts, expenses, etc. for the above two sets of railways.

It will be seen that the net receipts have steadily increased from 155,000 piastres in 1915 to over 400,000 in 1920, showing a very satisfactory development.

Nevertheless the average receipts have never been sufficient to cover running expenses and capital charges. This balance is naturally largely affected by the value of the plastre. It would, however, be a mistake to judge of the value of the railways solely from their balance sheets, for the railways are of considerable commercial importance and, as is equally the case with the roads, contribute to the development of the wealth of the colony.

Further, the railway system is by no means complete. Most of the existing lines are but a part of an as yet unrealized whole and when they are all connected up there is no doubt but that the traffic will be more than correspondingly increased.

Let us examine, for example, the end section of the Hanoï and Vinh railway from Than-Hoa to Vinh. Its local traffic in 1920 amounted to $1,181 per mile, an extremely low figure and comparable with that of the lowest section of the present system, viz that from Turan to Dong-ha ($1,224) which is actually the line the smallest earnings. Since it has been connected up with the railways of Central Tonkin its receipts have, however, attained $4,272 per mile, thus almost equalling the general average.

Furthermore, the present railway system is by no means complete and the following lines are either being constructed or planned for. In construction: the 162 mile long railway from Vinh to Dong-ha which will connect the system of North and Central Annam and thus complete the first half of the Trans-Indo-China trunk line. The work is being actively pushed forward and a part of the cost is being defrayed out of the $6,000,000 loan which has recently been floated, and which met with such signal success among the natives. Proposed: at the same time plans are being prepared for new lines in the south which will fill up the gaps of the Trans-Indo-China main-line between Turan and Nha-trang on the east and Saïgon, Phom-Penh and the Siamese frontier on the west. On the completion of these lines together with another to be carried out by the Siamese government and connecting Bangkok with the Cambodia frontier, it will be possible to go entirely by rail from Yunnan-fu in China to Bangkok in Siam via Hanoï, Hue, Saïgon and Pnom-Penh in Indo-China.

(*To be continued*)

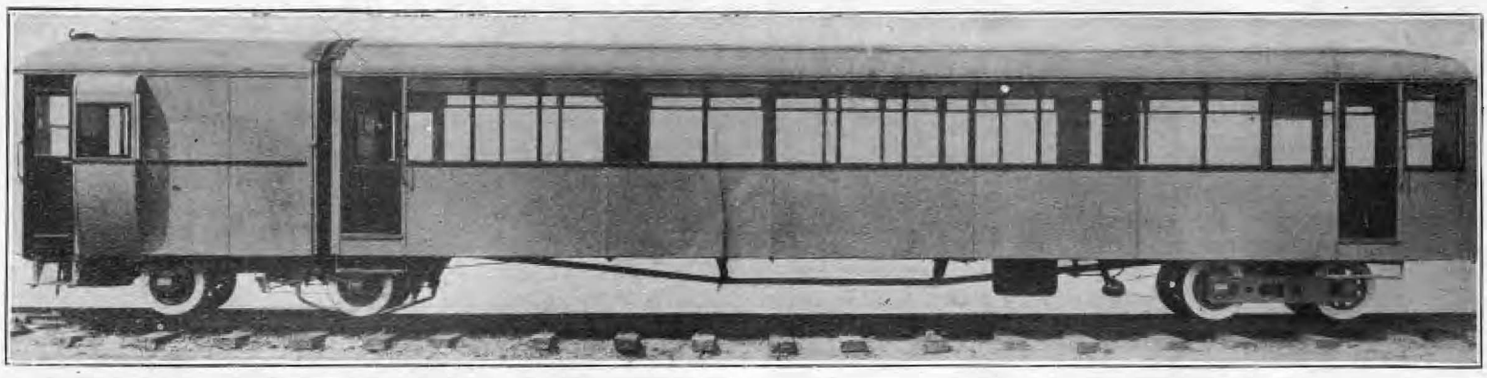
Tokyo Buys 400 New Street Cars

The Tokyo electric bureau is planning to order about 400 street cars from Nagoya. It is expected that the total number of street cars at the end of March will be about 1,200, and the congestion greatly alleviated.

At present, there are about 800 street cars operated in Tokyo. Jitney automobiles will be commenced to be operated on or about January 15 in Tokyo.

Before the earthquake, there were about 1,350 street cars operated in Tokyo.

The authorities will also order 1,000 automobiles to relieve the existing congestion; 300 automobiles have already been unloaded at Yokohama and 300 drivers have received licences from the metropolitan police board.



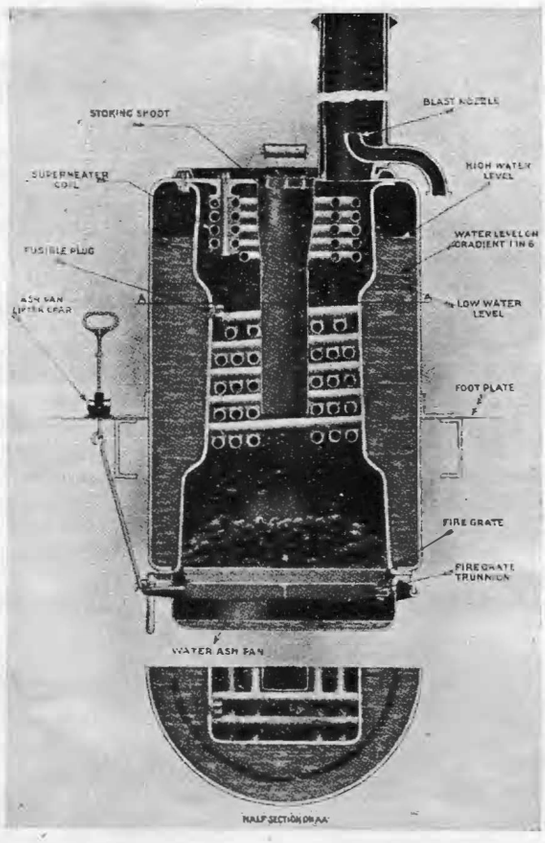
Steam Rail Coach for 50 Passengers.—Built by Cammell, Laird & Co., Ltd., Nottingham, England. Fitted with engine, boiler and controls, supplied by The "Sentinel" Waggon Works (1920), Ltd., Shrewbury, England

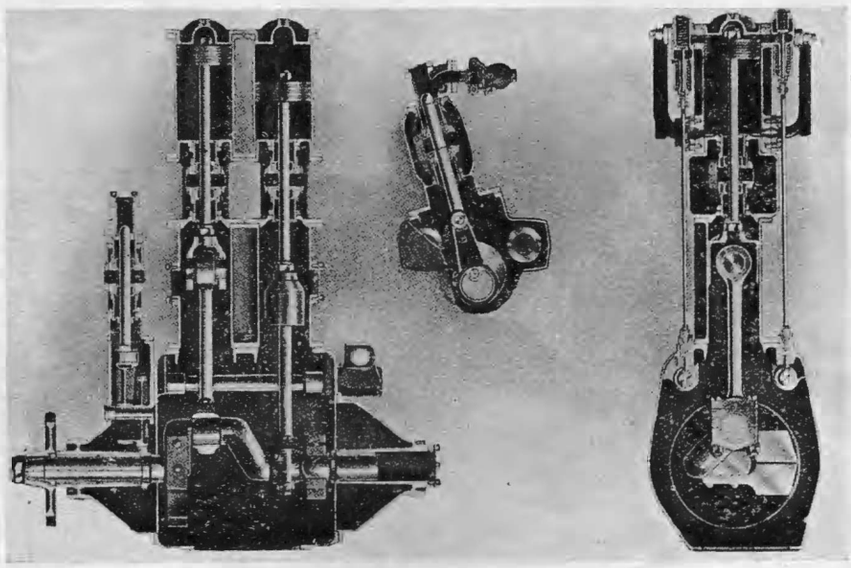
The "Sentinel" Steam Rail Coach

IN the early part of the present century quite a number of railway companies decided to attempt to operate branch line by means of steam-driven cars. The main idea was that such methods would be conducive to lower operating costs than those of ordinary locomotives and rolling stock. After various tests, the results were found in the main to be unsatisfactory from an economic point of view. The chief causes which contributed to the unsatisfactory results were that the weight of the vehicles was entirely out of all proportion to the number of passengers carried, while the motor coaches themselves were found to be too nearly modelled on the lines of regular railway rolling stock.

The railways recognized the difficulties they were up against in competing with road transport for the conveyance of passengers for short journeys and the transportation of goods in small quantities. The old-time methods of dealing with such traffic by means of the ordinary old-fashioned tank engine and coaches was found to be practically impossible to be continued unless at a heavy loss and consequently more economical methods were sought.

Seeing the difficulties that had to be overcome, and recognizing something totally different was required to what was already in existence, two of the leading British firms, both of which had many years of experience of locomotive waggons to their credit, evolved a railway vehicle, equally adapted to both passenger and goods traffic which could be operated at an overall running expenditure of 4d. to 7d. per mile. The higher figure includes the expenses incurred with a trailer and based on a service restricted to as little as 100 miles per day. The figures mentioned include all charges, *i.e.*, fuel, wages, repairs, depreciation, amortization, etc.





Top, Fig. 2: Vertical boiler with cross watertubes. Bottom, Fig. 3, two cylinder double action engine used in driving the "Sentinel" steam rail coach

The accompanying illustration depicts one of these new type vehicles, which is now in use on the Jersey Railways and Tramways Company's line. The line is a 3-ft. 6-in. gauge and is in consequence particularly adapted for rail car operations. The mechanical portion of the work has been executed by The "Sentinel" Waggon Works (1920) Ltd., while the body comes from the work-shops of Cammell, Laird & Co., Ltd.

The power unit itself is self-contained and is easily detached from the rest of the vehicle. It contains the engine, boiler, water and fuel receptables, controls, leading and driving axle, this last named being connected to the engine by a roller driving chain, and adjacent to the engine. A bogie is thus formed by the motor unit, with a wheelbase of 7-ft. It has a pivot to which the body is articulated, while the other end of the coach is carried upon a four-engine wheeled truck with a 5-ft. base. Between the sides and top of the engine cab and coach body there is a flexible connection, in order to render the appearance of the outfit symmetrical in every respect. The motor unit superstructure is made of steel plate with wooden doors, steel pannelled, on either side being a projecting look-out. In order to assist in taking stresses, and for other conveniences, the body of the coach is built integrally with the under frame. The bogie is constructed with side members and cross bars between which a well-sprung swing bolster is housed, the whole being very light and strong. Seating accommodation is provided for fifty-six, the interior being beautifully finished and decorated, as well as excellently ventilated and well lighted.

The boiler is of the vertical type with cross water tubes, central top feed for fuel, and with a coil superheater made out of solid drawn steel tube. The arrangement is shown in diagram 2. It is so constructed that the whole of the interior can be dismounted without in any

way interfering with the external fittings, and notwithstanding its high efficiency as a steam generator, the consumption of coal at most does not exceed 41-lb. per mile. The whole arrangement is simple and economical to a degree. The working pressure is 230-lb. per square inch, and the superheat amounts to 100 deg. F. There is a heater which utilizes the exhaust steam and also insures delivery of the necessary feed water at approximately boiling point.

The engine, which is shown in diagram 3, possesses several unique and interesting features. It has a two-cylinder double action motor, the cylinders being 6¾-in. in diameter by 9-in. in stroke, the admission and exhaust are controlled by independent poppet valves worked by camshafts; these can be moved endwise in order to give the correct distribution for either forward or backward running. Cut upon the shaft is an intermediate set of cams which serve to keep the valves open in the "stop" position to order to drain and warm the engine. This type of valve affords a reduced clearance as well as providing a perfect immunity from leakage; by these means a high economy of steam consumption is secured, which never exceeds 20-22-lb. per brake h.p. and in this respect the engine is superior to many compounds.

Another important feature is that the cylinders and casings for the connecting rods, shaft, etc., are totally and entirely distinct from each other although they can easily be bolted together. The packing glands provide an oil-tight housing for the motive parts and keep them continually flooded with oil but prevent any steam or water from the cylinders reaching them. By means of this perfect lubrication, combined with the extraordinarily large bearing areas which are allowed, extreme durability is insured for all parts which are subjected to wear. This in any event should always be low, as the engine speed is only 240 revolutions per minute at 20 miles an hour, which corresponds to a mean piston velocity of 360-ft. per minute.

The crank shaft, which is very accurately balanced, is made from high carbon steel, while nickel steel is used for the valves, piston rods, and connecting rod bolts, the valves being made entirely of stainless steel.

The pistons, which are lubricated by a positive mechanical oil pump, itself driven by the engine, are fitted with three rings, the pistons themselves being of great depth. The mechanical pump has also another use in that it acts as a feed pump for the boiler supply apart from what is supplied by an injector.

By an ingenious device, the engine timing when reversed, converts the motor into an air compressor, and thus makes a most effective albeit a very gentle brake. Apart from this, however, both hand and steam operated brakes are provided, the drums in connection therewith being incorporated in the track wheels.

Although the power unit denotes great strength, the total weight of both it and the coach is but 12 tons whereas previous rail motors has always varied from 40 to 45 tons. Under such conditions it is easy to see the saving that may be made in the cost of newly constructed lines since it is clearly demonstrated that a 30-lb. rail will be ample for such coaches.

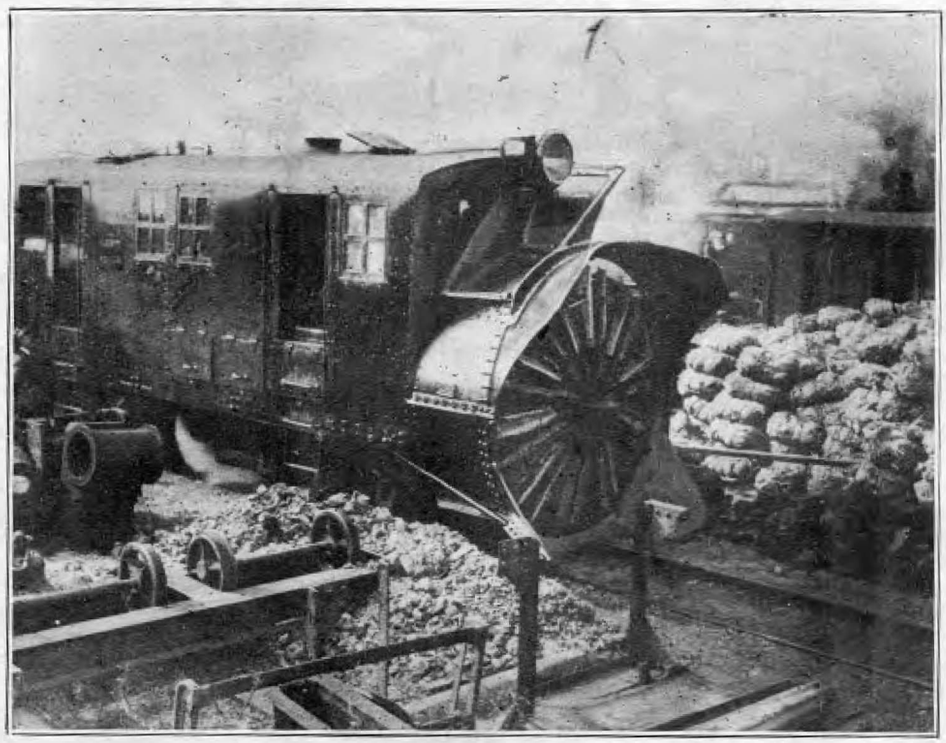
Summed up some of the most salient features of this new rail coach are (*a*) a great reduction in running costs; (*b*) extreme lightness the average weight per passenger being reduced from about 1,650-lb. to less than 500-lb.; (*c*) reduction in fuel and water consumption from 20 to 25-lb. and 18 gallons per mile to 4-lb. of coal and 2½ gallons of water per mile; (*d*) the fact that the sentinel boiler is designed to burn coal, coke, wood or charcoal without alteration, while oil will shortly be added to apply to standard units; (*e*) the enormous saving in costs in laying new tracks due to the lighter class of rails required.

Rotary Steam Snow Ploughs for Japan

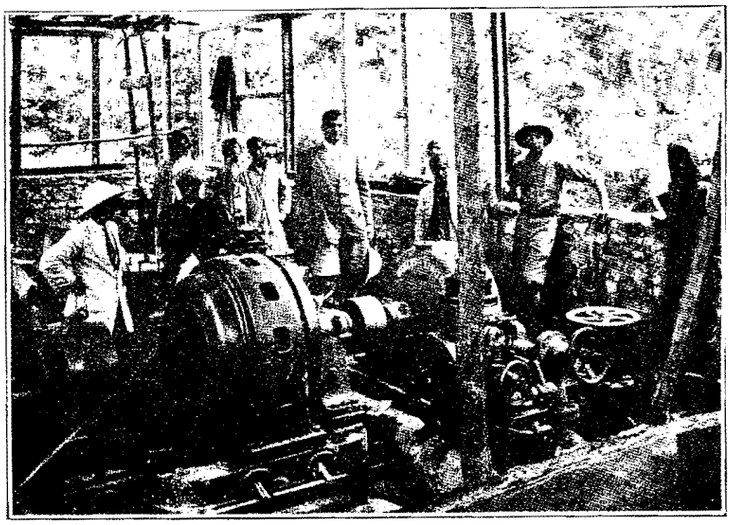
Two rotary snow ploughs have recently been purchased by the Japanese imperial government from the American Locomotive Company of New York as an experiment, and will be fully tested this winter in the heaviest snow country of Japan. If the results of the experiments prove satisfactory, many more will be ordered by the railway department from the makers, and will be used in place of the machines now in use.

Trial operations have already been made with one of the machines in the beginning of November in Kobe, when sawdust was used in place of snow. The rotary snow plough has a steel muzzle, ten feet in diameter, in which is installed a big drill fitted with ten double-bladed steel propellers, averaging sixty revolutions per minute. The plough is fitted with a 400 horsepower steam engine. The body is 12½-ft. long and weighs 60 tons; the cost is between 140,000 and 150,000 yen.

One of these rotary snow ploughs will be sent up to Hokkaido and the other to the Tohoku district in the northern end of Japan proper for winter testing.



Rotary Steam Snow Plough, manufactured by the American Locomotive Company for the use of the Imperial Japanese Railways in the Hokkaido. These ploughs were set up at the Takatori shops and trials made by ploughing piles of sawdust.



One of two 143-hp. Vicker's Impulse Water Wheels coupled to 6-pole, 100-kw., 3-phase, 50-period, 2,200-volt Water Wheel Alternators, in course of erection at Shillong Hydro-Electric Station

Hydro-Electric Installation

THE hill station of Shillong-Assam is situated 5,000-ft. above sea level, and a town lighting scheme supply from a hydro-electric installation is now being erected there.

The plant consists of two 143-h.p. single section governing impulse water wheels by Messrs. Vickers, Limited, model No. 95. The discharge is 2.95 cubic feet per second with a net head of 546-ft. Each wheel is fitted with nozzle hand control and oil pressure governor with the necessary governor connections and drives.

Each turbine is also fitted with a pressure gauge and a speed indicator. They run at 1,000 r.p.m. and are each coupled to a 6-pole, 100-k.w., 3-phase water wheel alternator, 50-periods, 2,200 volts with overhung exciters pedestral bearings and bedplate.

The photograph which we are able to reproduce shows the station in course of construction. Judging from the background of trees, it would seem to be situated in a very pleasant spot.

S.M.R. Industrial Developments

ACCORDING to H. E. President Kawamura, of the South Manchuria Railway, the estimates of the S. M. R. Co. for the next fiscal year are now completed. The total development funds, as asked for by the different departments, reach Y.80,000,000. How far this total amount will be cut down is unknown, but may probably be reduced to the neighborhood of Y.40,000,000 in the end.

In the above amount is included the sum of Y.7,000,000 for the first stage expansion program of the Anshan Iron and Steel Works. The company is heartily desirous of carrying out the program. For the succeeding fiscal year, 1925, Y.4,000,000 is proposed to be set apart.

While the starting of steel manufacturing depends upon the results of the investigations now in progress, President Kawamura is personally strongly inclined to embark upon that line of enterprise. The president appears most sanguine about the technical value of the new hematite reducing system of treating poor-ore, which constitutes the major portion of the Anshan iron vein. His excellency seems also satisfied of the commercial feasibility of this system.

The president has also given out that the company is now going to give more attention to the fostering of all kinds of industry in the S. M. Railway area and in Manchuria in general. The enthusiasm awakened among the Chinese towards industrial activity in recent years is wonderful. The spinning mills newly founded at Mukden may be mentioned as among the most promising. A soda factory has been established at Tientsin. Then at Chinwangtao a glass factory has been brought into being on a large scale. Behind all these ventures there is always competent foreign counsel and guide. The drafting of the plans and specialists, while gether with the installation of machinery, etc., has been attended to by foreign specialists, while these plants are kept going under superintendence of Chinese experts. Many of them have graduated from Japanese colleges. The present boom in the industrial China reminds one of Japan of about 26 years ago.

The S. M. R. Co. has asked Dr. Nishikawa, of the Kyushu Imperial University, to come over to the Kwantung leased territory for a professional study of the ground as a site for alkaline industry. Whether the same industry has an economic workability or not still remains to be seen, and awaits a verdict by Prof. Nishikawa. Supposing the verdict is rendered in the affirmative, whether the establishment of the same venture shall be undertaken by the S. M. R. Co., under private management with the company's backing, also remains indefinite.

The Kowloon-Canton Railway

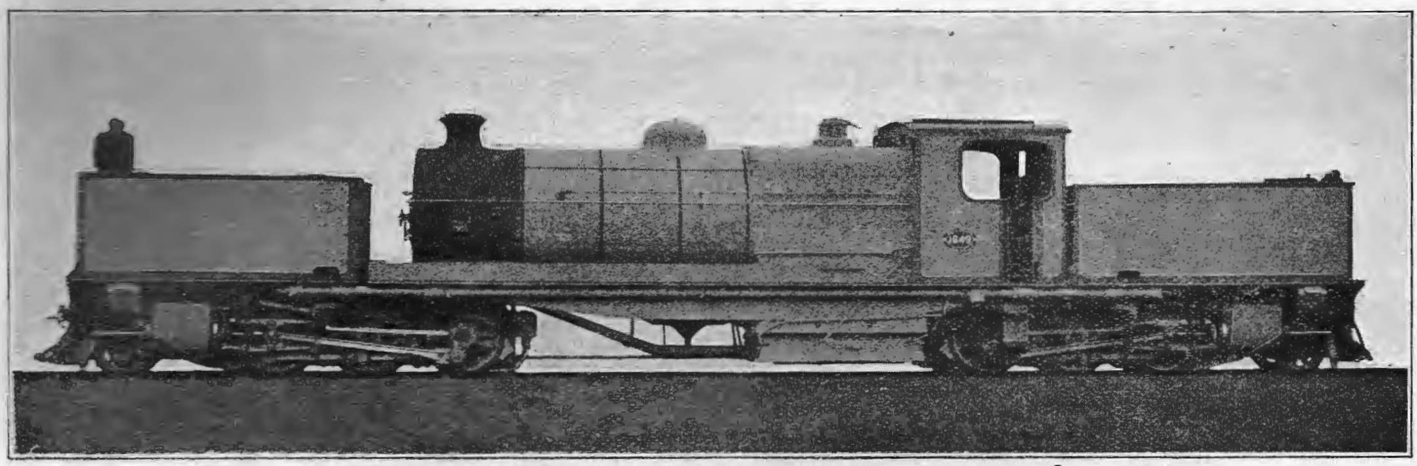
HONGKONG'S one and only railway seems to be falling from grace. It is a well-laid line, with substantial road-bed, broad gauge and heavy rails—in its way a model railway—and Hongkong has never regretted having built it nor having encouraged the Kwangtung authorities to make the connection with Canton. The British section of 22 miles, with the seven miles branch to Sha Tau Kok, was commenced in 1906, and the Chinese section in the following year. The capital sunk in the British line is put now at almost $16,000,000. The Chinese section (89 miles) has cost to date about the same sum, the money having been raised by loan to which British sources contributed. The Chinese end has never been particularly profitable, constant warring interfering with the traffic. The same causes have naturally had their effect on the British section, and despite careful management our 29 miles of track have not exactly made them rich. The net earning in 1921, to take a more or less normal year, was $75,989.71 ; but expenditure for that year totalled over a million dollars and revenue only two-thirds of that amount. The year 1922 showed a better balance, due partly to the increased traffic resulting from the seamen's strike, and partly to a reduction of special expenditure. For this year revenue and outlay were expected almost to meet, but again China's politicians have made the railway their sport, and a more than ordinarily severe typhoon has upset calculations. The capital sunk in the line is steadily mounting up and there is considerable justification for Mr. Lang's criticism in council that the undertaking is becoming an expensive item. The colonial secretary could only assure Mr. Lang that : " We have to keep it efficient in the hope that some day the Chinese section will also be efficient," and as to money expended for the Chinese section,he could not hold out much hope of recovery. Obviously, as was remarked, we cannot abandon the line : is it not to be the Oriental terminus of the wonderful iron way from London ? Nevertheless, the position of waiting and hoping and spending is far from satisfactory. If Kwangtung became peaceful and if branch lines were built to open up nearby mineral and other areas, we need not worry ; but before then many more typhoons must be voted for, and much Chinese suspicion removed. If we are to avoid interminable drain on our funds, it is time the government attempted to make our 29 miles support themselves as an independent unit. As between operating costs and income the balance is on the right side : it is the special expenditure that is running away with our money. For this year no less than $465,007 has been estimated, including $60,000 for extension to workshops, $100,000 for locomotives, $88,000 for a breakdown crane, $42,857 for boilers for locomotives, $32,500 for extension to carriage shed at Hunghom, and much more. Many of these things may be called for by efficiency, but perhaps not all. Under the circumstances the government might well apply the axe for the present, and as to the future, we would repeat our remarks of a few weeks ago on the subject of the development of the new territories. At present the railway practically depends on passenger traffic : there is no inland industry of sufficient importance to feed it with goods. If capital can be encouraged to take itself away from the city centre, it will be good for the railway, perhaps calling for several short branch lines, and good also for the community generally.—*Hongkong Telegraph.*

ASSOCIATED BRITISH LOCOMOTIVE MANUFACTURERS FOR CHINA

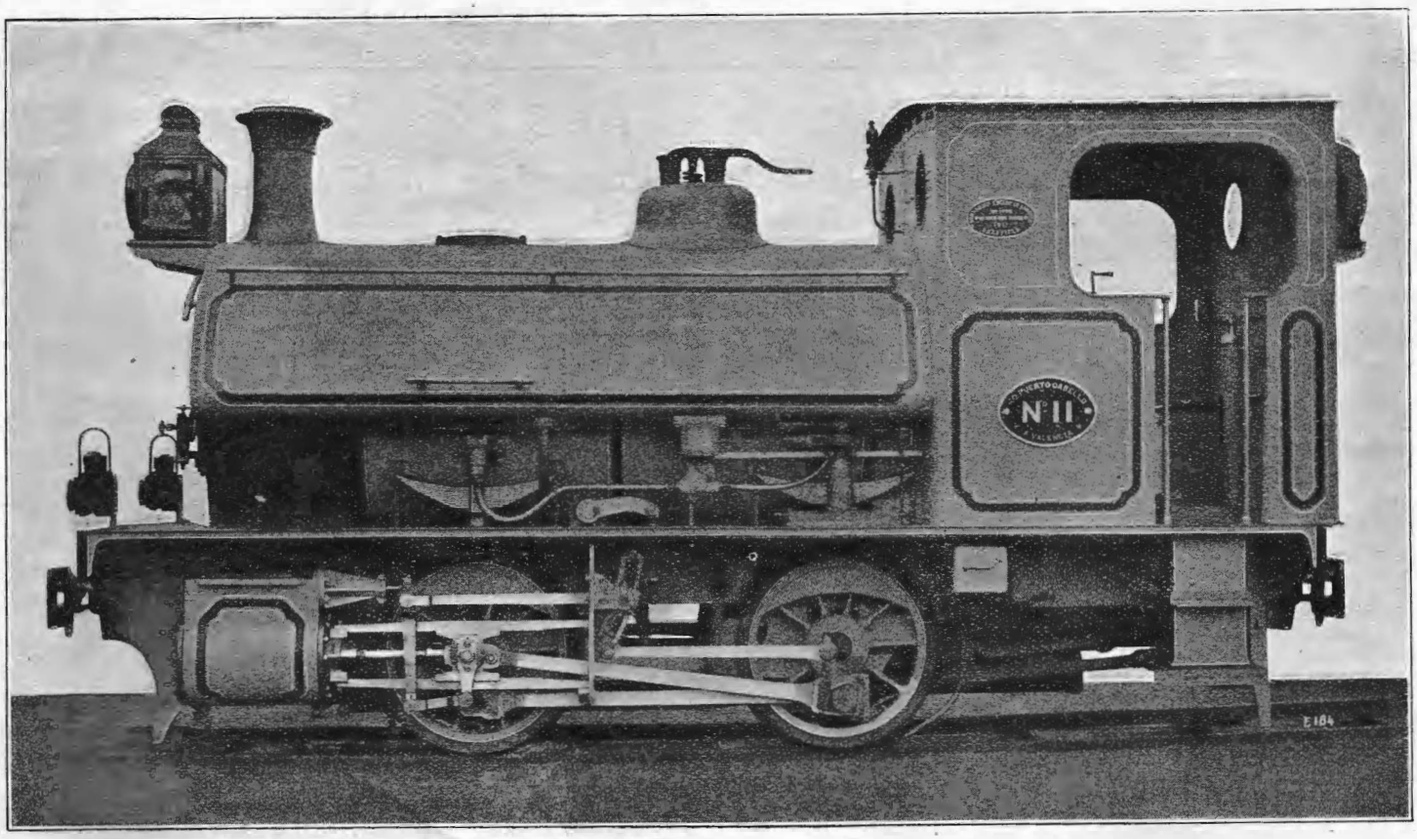
Head Office:
7 HOBART PLACE
GROSVENOR GARDENS
LONDON

TEL. ADDRESS: REBRITMAN, PEKING

Agents in China:
REPRESENTATION FOR
BRITISH MANUFACTURERS LTD.
46 WAI CHIAO PU CHIEH
PEKING



ANDREW BARCLAY SONS & CO., LTD.
THE AVONSIDE ENGINE CO., LTD.
W. G. BAGNALL LTD.
BEYER PEACOCK & CO., LTD.
HAWTHORN LESLIE & CO., LTD.
HUDSWELL CLARKE & CO., LTD.
THE HUNSLET ENGINE CO., LTD.
KITSON & CO., LTD.
NASMYTH WILSON & CO., LTD.
THE NORTH BRITISH LOCOMOTIVE CO., LTD.
ROBERT STEPHENSON & CO., LTD.
THE VULCAN FOUNDRY, LTD.
THE YORKSHIRE ENGINE CO., LTD.



AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

大正七年七月十日第三種郵便物認可

P. CHIERI 1924

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

BACK TO PORTSMOUTH

United States Court for China Claims Jurisdiction in the Kwantung Leased Territory

A PERVERSION OF HISTORY

Due to Wilful Ignoring of Facts

CHINESE RAILWAY DREAMS

BOXER INDEMNITY

RACIAL ISSUE REVIVED

ELECTRICAL DEVELOPMENT OF MANCHURIA

OSAKA, THE HEART OF INDUSTRIAL JAPAN

TWENTY-FIVE YEARS OF SUCCESSFUL CO-OPERATION

JOHORE CAUSEWAY

INDUSTRIES OF INDO-CHINA

Vol. XX February, 1924 No. 2

SHANGHAI, PEKING, TOKYO AND MANILA

In the heart-to-heart talk between General Leonard Wood and the military leaders of Japan held in Tokyo a few months before the opening of the Washington conference the cards were laid on the table. There was no bluffing. The irreducible minimum of concessions on both sides was frankly and openly declared. Japan's minimum was the preservation of her acquired rights and position in Manchuria and the Kwantung leased territory. This unofficial exchange of views cleared the way for the brilliant success of the diplomats at Washington. Japan entered the conference willing to make every concession for peace compatible with her dignity and vital interests. She drew the line at Kwantung, and cancellation of the 1915 treaty.

The American note quoted in Commissioner Lurton's decision is therefore offset by Baron Shidehara's equally emphatic statement. For nineteen years the state department has acknowledged Japan's sovereign rights in Kwantung and it will do no good to reopen an issue permitted to die a natural death, as a result of a frank exchange of views by both America and Japan. It is well to let sleeping dogs lie.

If the ruling of the U. S. court for China is correct when it says that rights acquired within the integral territory of China by treaty can be abrogated in no other way than that in which they were given (in other words, before the United States relinquishes extraterritoriality in any portion of China as it existed in 1844 there must be definite action taken by congress) we are headed for another merry old squabble over China. By the same logic and ruling the judge of the U. S. court for China retains jurisdiction over Americans residing in the Kowloon leased territory, notwithstanding China's surrender of jurisdiction in the lease. It is safe to say however, that if an American is arrested, tried and punished by a British court for some infraction of the laws committed in the slice of China leased to Great Britain, the question of American jurisdiction will never be raised, nor can we picture the U. S. court for China holding a hearing over an American charged with committing a crime in this region. It now remains for the Japanese authorities to arrest, try and jail the first American offender against their laws in Dairen in order to precipitate another international brawl. If the ruling holds good, the state department must energetically protest against such interference with the rights of Americans conceded by China in 1844. In all fairness it would have to do the same if the British should so far ignore our just rights and exercise juridical powers over Americans residing in the Kowloon leased territory.

It is just possible, however, that a higher court will overrule Commissioner Lurton's interpretation of the treaties in order to avoid another general row over the meaning of what constitutes China and to preserve the dignity of the state department. If congress should now be asked to take action on all impairments of China's sovereignty and alienation of territory since 1844 what a jolly old international comedy would be staged when the curtain is rung up at Washington by the introduction of the several bills required to fully cover these infringements of American treaty rights.

Let us look at the question from another angle. If the American court retains jurisdiction over its citizens in the Kwantung leased territory, so do all other nations. Now Kwantung is ruled by a Japanese governor-general. It is a military stronghold, the strategic key for the proper defense of Japan against another attack from the north. In this territory, Japan must exercise full juridical rights, or her position from a military viewpoint becomes impossible. In the event of hostilities or military preparations against any contingency, under this ruling Japan would be unable to exercise jurisdiction over spies and enemy agents. On this score alone the ruling prohibits her from exercising powers vital to the maintenance of her position.

Some time long before the expiration of the leases to Kwantung, Kowloon and Kwangchow-wan, foreign extraterritorial rights will be surrendered in China. If the ruling of the U.S. court for China is upheld, all foreigners residing in these leased territories will then automatically come under Chinese jurisdiction, and to carry the decision to its logical end, the establishment of Chinese courts within these territories will follow as a matter of course. Japan will then have no power over foreigners residing in her leasehold who violate her laws or military regulations. What a fine mix-up this will cause.

The decision strengthens our own contention that there are no statue of limitations to international wrong-doing, and when the United States court for China harks back to 1844 to support a decision and asserts that even the state department has been mistaken in its interpretation of the treaties ever since John Hay recognized Japan's sovereign powers in Kwantung, then Japan would be equally justified in harking back to 1896 and demanding a revision of the treaties based on the new evidence disclosed in the confession of China before the international conference at Washington. It's a poor rule that don't work both ways.

Higher authorities may or may not uphold the court, but the decision will stand in the records as the carefully prepared interpretation of the treaties by a legal expert. By appealing to the same line of argument the Japanese government is provided with a precedent justifying it at any time it considers opportune, in asking for a reopening of the whole Manchurian question. The raising of the issue by the U. S. court for China may call for a complete readjustment of Far Eastern political boundaries, and in the light of China's own confession, an end would be brought for all time to the interminable nagging of Japan as to her rights in Manchuria and Kwantung.

Chinese Railway Dreams

NOTWITHSTANDING that up to the organization of the consortium the Chinese government had contracted for the construction of over 12,000 miles of new railways which at prevailing costs will require the floating of loans aggregating over a billion gold dollars, every now and then comes the news of agreements for the building of additional lines. To the above mileage is now added another 2,000 miles for the Canton-Chengtu railway with its branches and the three lines recently contracted for in North China totalling five hundred or more miles and calling for an additional three to four hundred million gold dollars to the billion or more in loans waiting to be floated. There is not enough available money in the world to finance China's legitimate railway contracts, yet still they come, flocking to the Eldorado where fool's gold lures the inexperienced and blinds his eyes to the truth.

The Canton-Chengtu-Yunnan Lines

In April of last year, Dr. Sun Yat-sen, in his capacity as head of the southern confederation of provinces, entered into an agreement with the Northern Construction Company of Vancouver for financing and constructing a railway from Canton to Chengtu in Szechuan with a branch parting from the main system somewhere in Kweichow province and terminating at Yunnanfu. In the event of unification of the government, Dr. Sun compromised on behalf of the southern provinces that the contract would be recognized and taken over by the central authorities. The terms were similar to the agreement signed in 1913 between Dr. Sun and Pauling & Company, Ltd., for the building of the same line and like that contract stands as the most favorable to China yet entered into for railway construction. The contractor agreed to build and equip the line on a basis of five per cent. construction profit or one-third less than Pauling & Company and three-eighths under the Siems-Carey terms. The financial conditions were left open in the preliminary agreement in order to enable the contractor to sound the financial markets in Canada, America and England. He was allowed six months to do this with a further six months in the event satisfactory progress could be shown. Another six months extension was provided for in case conditions warranted it, but it was understood that unless the contractor could raise

the loans on satisfactory terms within twelve months, the agreement would be null and void. The bonds on the first two sections of the line traversing Kwangtung and Kwangsi were to be guaranteed by the governments of these two provinces and secured on the provincial revenues pending national unification, when they were to be additionally secured on the general revenues and good faith of the central government of China. On the whole, the contract was conditional on the ability of the contractor to furnish the loans on terms acceptable to Dr. Sun and does not compromise the Chinese people to any surrender of a valuable right. Its one outstanding feature is the extremely low construction profits. These will stand not only as a further proof of Dr. Sun's honesty and ability but as in the case of the Pauling contract of 1913 serve as a guide for future contracts of a similar nature. Owing to the existence of the consortium agreement the contract may never be carried out, but Dr. Sun took a chance with the largest railway constructors of Canada and in so doing created terms which others will have to meet in any open or fair competition for the construction of future railways in this country. Owing to the absence of definite surveys it was obviously impossible to estimate the exact cost of the proposed lines or formulate an approximate idea of the extent of the loans necessary. Each section was to be surveyed, the costs estimated, the loans calculated upon these figures and the details of each installment to be agreed upon before being placed on the market. Viewed as a percentage contract it is above criticism and whatever may be the objections to Dr. Sun in a political sense he once again demonstrated that China can obtain exceptionally favorable terms in open and honorable dealing with foreign constructors.

The line and its branches as proposed by Dr. Sun is most vital for the proper economic development of China, linking together the provinces of Kwangtung, Kwangsi, Kueichow, Yunnan and Szechuan and providing a deep water port within Chinese jurisdiction as an outlet for the trade and products of this vast region. If a deep water port is ever created at Canton, the construction of this railway and the completion of the Canton-Hankow line will draw all the traffic of south and southwestern China to its legitimate outlet. Politically, the Canton-Chengtu-Yunnan line will bind together the liberal provinces of the south and enable them to present a solid front against any future attempt on the part of northern militarists or monarchists to overthrow a constitutional government. It was for this reason that Yuan Shih-kai vetoed the original contract for this line between Dr. Sun and Pauling which he contended would develop Canton into a large commercial centre with huge revenues for the Kuomintang party which would enable the parliamentarians to block his plans to revive the monarchy. For this reason he insisted in the final agreement, that the line be changed to one beginning at Shasi on the Yangtze and terminating in Singyfu in southwestern Kweichow, there to connect with the French Yamchow-Yunnanfu line. The political and economic value of the Canton-Chengtu line and its branches are so great that in any compromise between the warring factions resulting in a unified government, Dr. Sun Yat-sen and the other chiefs of the southern provinces will enforce as one of their conditions the recognition of this contract in order that the south will be given an even break with the north in the allocation of national revenues as security for future railway construction.

The Hollamby Contracts

In contrast to the contract for the Canton-Chengtu line signed by Dr. Sun are the three agreements alleged to have been entered into by certain Chinese "promotors" in North China with the British firm of Hollamby & Company. Although the identity of the Chinese principals to these contracts is somewhat obscure and the Waichiaopu is reported to have repudiated them, full information even to the details of the preliminary agreement have been printed in the Peking and Tientsin newspapers. The railways said to have been contracted for, are (1) the Chefoo-Weihsien line, at an estimated cost of £4,000,000: (2) Tsangchow to Shikiachwang to cost £5,000,000 and (3) a line from Tientsin to Chihfeng in Eastern Inner Mongolia, to cost £10,000,000, a total of £19,000,000.

The Chefoo-Weihsien Project

It is difficult to believe that any sensible business man would enter into a contract for financing and building the above-mentioned lines and pay in advance a stipulated sum equal to five per cent. of the total loans (in the neighborhood of four and a half million gold dollars) when previous claims are taken into consideration. The projected line from Chefoo to Weihsien has filled more newspaper space than any other one railway proposition in China. Ever since the Germans entered the province of Shantung in 1898 there have been schemes, intrigues and fights between the central and provincial governments on the one hand and between the Chefoo chamber of commerce, the merchants and gentry on the other, over the right to finance and build this railway. It would serve no good purpose to spoil more good newspaper and tire the reader with a resumé of the history of this scheme. The only point that matters is that in the Shantung treaty between Japan and China signed at Washington in February, 1922, Japan surrendered all preferential rights inherited through taking over the rights of Germany in that province, and, further, renounced any claim to have the Chefoo-Weihsien railway included in the consortium pool, *provided the line is to be constructed with Chinese capital.* This would appear to be very clear, so when the Chinese now enter into an agreement with the British firm of Hollamby & Company acting as agents for the Anglo-Chinese Ventures Syndicate, Limited of London, it violates the treaty with Japan signed as one result of the Washington conference. This attempt to keep alive the agitation against Japan would seem to be strengthened by a further study of the facts surrounding the other two projected lines included in the contract.

The Tsangchow-Shikiachwang Line

It may be quite proper to differentitate between a railway crossing the zone between the Peking-Mukden and Tientsin-Pukow lines connecting Tsinanfu and Shuntehfu and a line a little further to the north connecting Tsangchow and Shikiachwang. For all practical purposes they will serve the same region. The construction of one makes the other superfluous. Now the line from Tsinan to Shuntehfu is also one of the concessions inherited by Japan from Germany and subsequently confirmed by the signing of an agreement between Japan and China in September 1918. Japan paid over to the Chinese government the sum of Y.20,000,000 as an advance on the loan for the construction of this and the Kaomi-Hsuchow line. In the Shantung treaty signed at Washington (referred to above) Japan's rights to these two lines were surrendered to the international financial group. China's acceptance of this transfer of rights constitutes on her part an official recognition of the consortium and an obligation to repay the advances on these loans. To destroy the value of the Tsinan-Shuntehfu link, before this obligation is met would seem to be a flagrant breach of the Washington treaties. The purpose of both the Tsinan-Shuntehfu and the Tsangchow-Shikiachwang lines is to link the two north and south trunk railways and while there is a special reason for the latter which provides the Cheng-Tai line with a more direct outlet to Tientsin there can be little doubt that the object of the contract is to raise a political question with Japan or the consortium powers.

The Tientsin-Chihfeng Line

The full extent of the politics surrounding the Hollamby contracts is more clearly seen in the line from Tientsin to Chihfeng in Eastern Inner Mongolia, though here the politics are as much internal as international. The Peking and Tientsin newspapers state that the construction of this line has been strongly urged by General Wu Pei-fu, and if this is the case, it must be accepted as a strategical move, which if carried out, would enable General Wu to outflank General Chang Tso-lin in the final fight between these redoubtable war-lords for supremacy. But aside from this, the line is very clearly intended to destroy the value of the Taonan-Jehol agreement on which Japan paid China Y.20,000,000 as an advance on the loan for its construction. This line was also handed over by Japan to the consortium during the negotiations at Washington, which once more obligates China to recognize the monetary advances and protect the rights of the consortium. The new line will not touch at Jehol (Changtehfu) but pass some distance to the east on its way into Eastern Inner Mongolia and its terminus at Chihfeng. Both the American and British governments very bitterly opposed Japan's right to build the Taonan-Jehol line and rejected her plea that it was necessary for the proper protection of China and Japan against "the menace from the direction of Urga." Japan also had the right to build a branch that would have connected this line somewhere in the Jehol district with the sea, the

intention being to have its outlet near Chinchow. The new line will tap the richest districts tributary to the Taonan-Jehol project. Now it may be that a British company can step in and take over rights that have caused so much international hard feeling and on which large sums have been advanced; but we doubt it. If the British government should fail to disapprove this contract, the Japanese government will undoubtedly protest it and in this would have the support of the American government through whose initiative Japan was influenced to surrender her rights to the Taonan-Jehol line. Japan paid Y.40,000,000 to China as an advance on the loans required to build the Mongolian and the Shantung railways and was compelled through the pressure of the other powers to surrender these rights and pool them with the consortium. She also waived her right and that of the consortium to the Chefoo-Weihsien line, provided that it be built with Chinese capital. Japan has not received one cent. of interest on her advances, and to date China is in default nearly Y.20,000,000 on interest alone. Yet the Chinese gleefully hand over the rights that has cost Japan about Y.60,000,000 in order to obtain an advance from a British company. And there are many writers who will defend China and call upon heaven to support her in any scheme that will place Japan in the position of opposing the "open door" doctrine.

The names of the interested Chinese are not given. They are simply designated as "the promoters." It is understood that the parties to the Chinese side are officials and gentry of the towns and villages traversed by the line, which, if true, is evidence that the ministry of communications and the Peking cabinet have revived private railway ownership and that a company duly registered and licensed has been organized and represented by the so-called "promoters." In such a case, a loan would have to be a purely private transaction without any guarantees other than the employment of a British chief-engineer, chief-accountant and traffic manager. The Waichiaopu disclaimer of any knowledge of the contracts would strengthen the belief that the full story remains to be told. Northern newspapers have hastened to congratulate the British contractor, but until more definite information is available we are inclined to the belief that condolences are more in order.

The Turning of the Tide

FOR reasons we have never fully understood, it is rare that a British editor or writer has a good word to say for Dr. Sun Yat-sen or his cause and this sentiment is echoed by the so-called exponents of American opinion published in China, controlled directly or indirectly by British interests. It is, therefore, a relief to read in American newspapers words of respect and cheer for the man who, despite his shortcomings, stands head and shoulders above all other Chinese leaders as a champion for honest government. There is increasing evidence, if such evidence be needed, that American love of fair play can be depended upon at a crisis to come to the moral support of the under dog in a fight for the establishment of a government, which, however, far it may be from their conception of democracy, is at least the first crude step towards the attainment of a great ideal in Asia.

Somebody blundered when seven American war-ships were rushed to Canton to join in the demonstration to overawe Sun. It is still a mystery how it all happened. The request for their participation did not come from the American consular or naval authorities in Canton. When the British consul at Canton proposed to blockade the port before the diplomatic corps at Peking had formulated their answer to Dr. Sun's first request for a share of the surplus, the American and Japanese consuls declined to participate without the express authority of their governments. Mr. Jenkins, the American consul-general, even telegraphed to his legation that he did not believe the situation warranted the action proposed by the British and French admirals, but in the event that an economic blockade be estabhshed it was suggested that America should participate while reserving freedom of action.

The American legation informed Mr. Jenkins that the diplomatic corps did not approve an economic blockade and the legation itself did not favor landing sailors or marines to prevent the seizure of the customs. Mr. Jenkins was furthermore informed that should Dr. Sun seize the customs the consular body at Canton would receive wide powers for action short of actual warfare. While these exchanges were taking place Admiral Washington, then in Philippine waters, received instructions to concentrate all available ships of the Asiatic fleet at Canton, but further orders intervened which resulted in the dispatch of four torpedo boats and two gunboats to the Canton bund. The mystery as to who influenced the Washington authorities to take such a drastic step without consulting the legation at Peking may never be cleared, but for the present it is a public secret that the demonstration was precipitated by the premature recommendation of the British consul-general without consulting his colleagues in the consular body.

The American people have a very good idea of how they were made to appear as the most aggressive partner in this international show of force for the protection of a security in which they have no direct interest. The *Newark Evening News*, one of the best informed American newspapers on Far Eastern matters, after summarizing the Chinese side of the incident, says :

"If the South China leaders are right about it, then what reply can the powers, particularly America, make ? They can say, and they have said, that the Peking government is the only recognized government in China. It is—so far as the foreign powers are concerned. In China it is not so recognized. Peking rule is ignored in more than half of the provinces. It is abjectly helpless outside of Chihli province so far as the enforcing of its orders is concerned. The new President, Tsao Kun, purchased his election by the bribery of members of parliament at an admitted cost of more than $1,000,000. Even school children, unchecked, parade the streets of the principal cities carrying banners denouncing the 'money-bought president.'

"It is true that if the powers did not collect the customs revenues and give the surplus to the Peking government under Tsao Kun that government would fall. And the powers hold that then there would be chaos. It could hardly be worse, however, than the confusion worse confounded now existing. Up to date the predictions of the wonders to be wrought in China as a result of the Washington conference have largely failed to materialize.

"Should there be intervention in Canton, perhaps the resultant reaction would be an anti-foreign movement as wide and serious as the Boxer outbreak. That would be unfortunate for the whole world, especially for America, whence came the plan for saving the Far East."

In commenting on the Canton situation, the *Boston Globe* says :

"The situation is not particularly pleasant for Americans to contemplate, as Dr. Sun has earned a fine reputation and there is little reason to think him mistaken about what happens to the surplus revenue sent to Peking. Americans do not relish the use of their flag over the office of a collector of debts which never should have been contracted. The whole business is too messy to be pleasing."

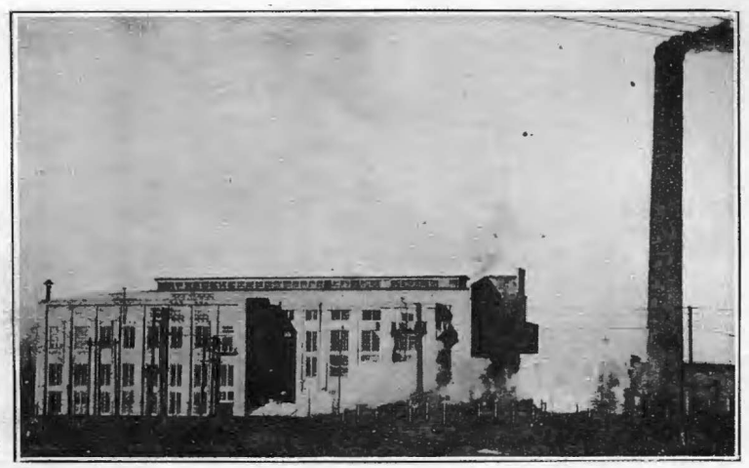
What has America gained by standing solidly with the other powers in support of Chinese militarism ? What is the effect upon the Chinese mind as the result of this and the campaign waged for armed intervention in order to strengthen Anglo-American cooperation in these matters ? The answer is very simple. America is losing the trust and confidence of thinking Chinese who believe that we are now the worst enemy of their country instead of its most disinterested friend. "With a labor government in England and desire for friendship on the part of Japan, our most dreaded enemy at present is the United States," remarked one of the foremost Chinese business-men of Shanghai the other day.

This opinion will spread rapidly and Americans will pay heavily for the crude handling of a very delicate situation by a small clique who passed vital resolutions affecting the interests of the whole community without reference to its wishes. It is the turning of the tide.

resort, three miles from the terminus of the city line, was opened for traffic on August 1, 1911. The conveyance of bean and beancake by electric tramway is operated between Hsiaokangtzu (the Chinese quarter) and the wharf, a distance of about 2½ miles. The running mileage at the end of 1921 was increased to altogether over 31 miles, and the numbers of cars now in use are 65 passenger cars, 10 goods cars, and one water sprinkling car.

The remarkable decrease in the amount of outlay of Dairen during the fiscal year 1916 was due to the fact that the electric work shops were transferred to the management of the Shahokou Workshops in July, 1916.

Working year.	Kilowatts generated.	Receipts in yen.	Outlay in yen.
1918	17,098,532	1,423,864	859,821
1919	19,548,810	1,232,095	923,589
1920	19,220,920	1,632,599	1,074,617
1921	22,802,097	1,910,914	1,055,260

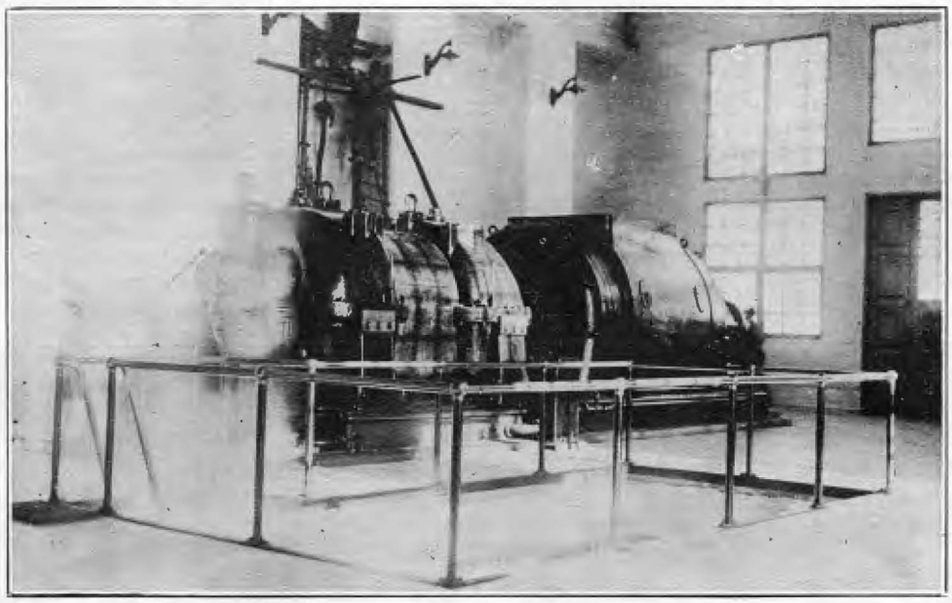


View of Amanogawa Power House, Dairen

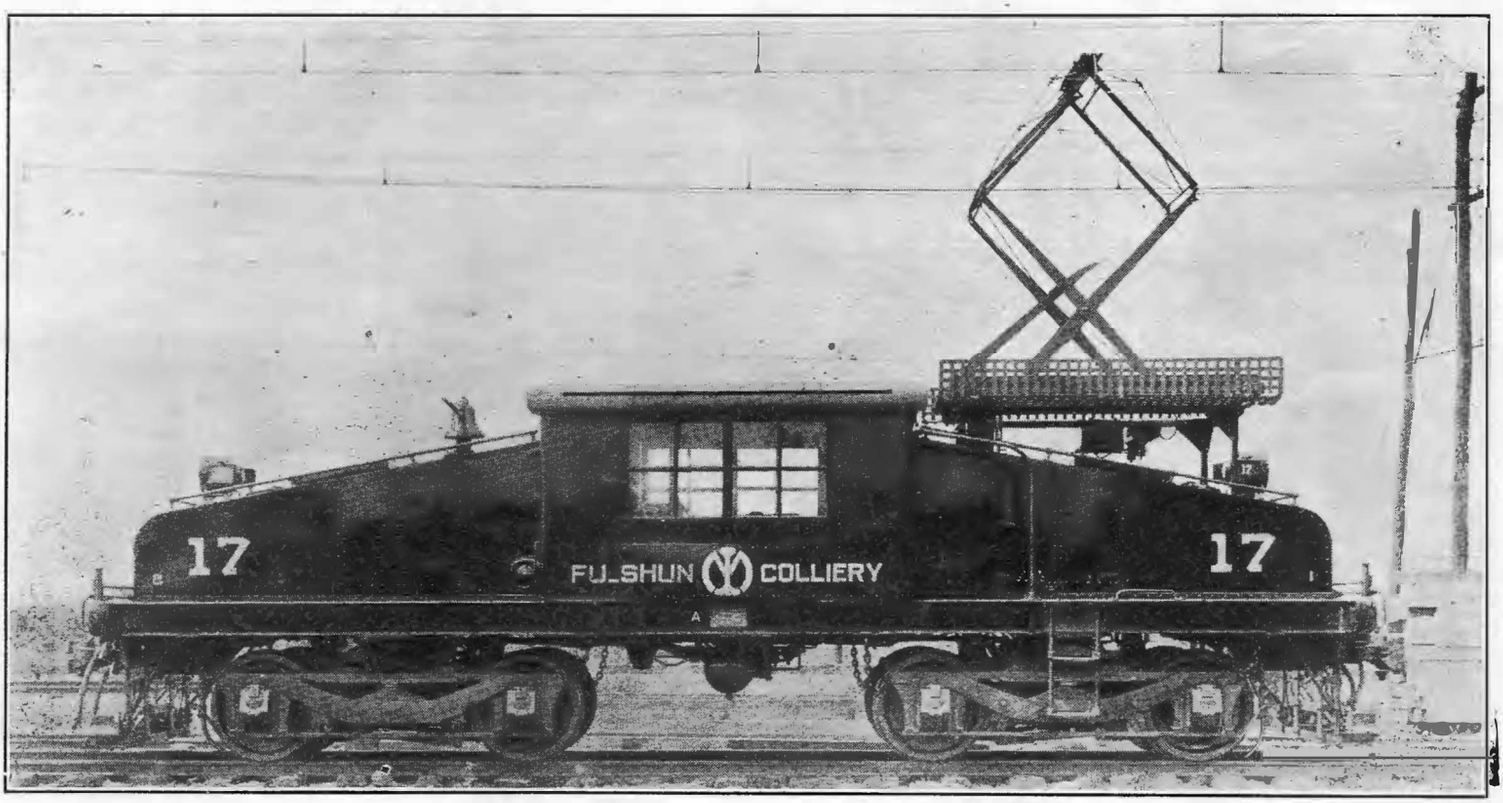
Power Plant Equipment

The Hamacho power plant has a lamp capacity of 550,000, of which 250,000 lamps are in use, at a cost to the consumer of Y.1.20 per 16 candle power lamp. The No. 1 power house has a capacity of 6,000 k.w. and No. 2 of 5,000 k.w. The original Hamacho station (No. 1) supplies 24,033 consumers with 171,594 lights of a total candle power of 7,127,-520 and 227 consumers with 7,000 horse-power for 516 motors. The equipment of this plant is as follows :

Generators.—A.C., 3 G.E. 1,000 k.v.a.; 2,300 v.; 25 cy.; 125 r.p.m.; direct connected to McIntosh and Seymour ver. comp. engines; 1, 1875 k.v.a., 2,300 v.; 25 cy.; 1,500 r.p.m.; G.E., Curtis turbine set; 1, 1,875 k.v.a., 2,300 v., 25 cy., 1,500 r.p.m.; G.E., Curtis geared turbines set. Exciters; 2, 100 k.w. Mitsubishi; 1, 75 k.w. G.E.; 1, 30 k.w. G.E.; 125 v.; direct connected. Boilers: all B. & W., 8, 3,530 sq. ft. h.s.; 1, 5,090 sq. ft. h.s.; 150-lb. working pressure; Jones underfeed stokers. Blowers, 3; pumps, 5; open heaters, 1; coal saving and crushing appliances.



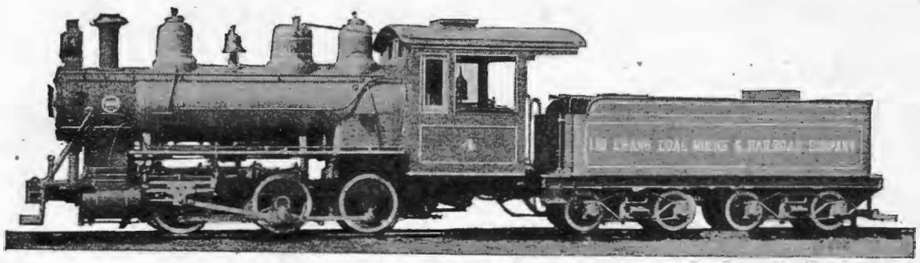
5,000 K.W. Westinghouse Turbo-Alternator installed in the Amanogawa Power House, Dairen



1,200 volt G.E. Locomotive operating at the Fushun Colliery of the S.M.R.

BALDWIN

Industrial Locomotives



SIX-WHEELED SWITCHER
built for
LIU CHANG COAL MINING AND RAILWAY CO., CHINA

Gauge, 2-ft. 6-in.
Cylinders, 12-in. by 16-in.
Working pressure, 160-lb.
Driving wheels, diameter, 33-in.
Weight, engine, 40,700-lb.
Weight, engine & tender, 76,000-lb.

The start of the first trial run of the Baldwin Six-coupled Switching Locomotive from the Liu Chang Mines to Chinwangtao.

The Baldwin Locomotive illustrated shows a type which has given very satisfactory results in industrial service in many countries of the world.

This type is adaptable for light switching or general contracting service and is easy on tracks and bridges. It may also be used in long runs.

Let our nearest representative assist you in selecting types best suited to your needs.

OFFICES:

J. M. Wright, Bandoeng, Java, D.E.I. **J. W. Kelker, Harbin, Manchuria**

AGENTS:

Andersen, Meyer & Co., Ltd.
Peking and Shanghai

Sale & Frazar, Ltd.,
Tokyo and New York

RESIDENT TECHNICAL REPRESENTATIVES:

R. E. McFalls, Peking, China **E. P. Williams, Jr., Shanghai, China**

J. F. Greig, Tokyo, Japan

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA, U.S.A.

Cable Address : **"Baldwin, Philadelphia"**

1134

LOCOMOTIVES

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

上海仁記路第五號

A SUPER-EXTRA TERRITORIAL AMERICAN GOVERNMENT IN CHINA

AGAIN, THAT SUPERFLUOUS STATE DEPARTMENT

ANGLO-AMERICAN CO-OPERATION

JAPAN'S MESSAGE TO CHINA

JAPAN'S NAVAL POLICY

DEVELOPMENTS IN THE FAR EASTERN STEEL INDUSTRY

IRON ORE IN THE N.E.I.

PETROLEUM IN THE N.E.I.

MINERAL RESOURCES OF THE ALTAIS

THE CHINESE EASTERN RAILWAY ZONE

J. CHIERI

Vol. XX | March, 1924 | No. 3

The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XX SHANGHAI, MARCH, 1924 No. 3

A Super-Extra-Territorial American Government in China

The Menace To Peace in the Pacific

An Astounding Revelation

By Geo. Bronson Rea

CHIERI 1924

Foreword: Is there an invisible American government in China? That such an organization exists and functions is admitted by its secretary. Our personal experience is sufficient proof that this inside group is capable of employing unethical methods to destroy the usefulness of those who oppose its policies.

For the past four years this magazine has been subjected to a merciless persecution. During the war while its publisher was in the army it was placed on the American black-list because it was said to have "sold out to the British." After the war a secret boycott was declared against it, because it was alleged to have "sold out to Japan." Confidential pamphlets calculated to destroy its circulation were mailed to all subscribers. False and libellous statements were printed with the object of discrediting its publisher. For two years our name was erased from the mailing list of the American chamber of commerce, notwithstanding that we were a charter member and paid its secretary for the first two years of its existence. We were served with a libel suit on the flimsiest pretext and for damages nicely calculated to compel a sale of the publication if the judgement went against us. After explaining our position before an executive session of the American Chamber of Commerce and producing documentary proofs to support our statements, we were again threatened with a libel suit by a British subject, through the same law firm. In fact, nothing was left undone to destroy the business of this magazine.

All investigations to ascertain the identity of our persecutors lead straight to a small group who form what might be termed an invisible government, with one of the cabinet profiting through our misfortunes.

We abhor anything which looks like a newspaper fight, but the assumption by an American editor of administrative duties and his efforts to decentralize American governmental authority in China in order to strengthen the powers of the group of which he is the official spokesman, leaves us no option.

Journalism has its ethics as well as other professions. The higher code debars an editor from occupying public positions which in any way interfere with his liberty of criticism. A similar code prohibits an official from using his position to destroy the usefulness of a competitor for the benefit of his own enterprises. Yet for the last five years THE FAR EASTERN REVIEW has been compelled to submit to such practices. We have been brought to the bar of justice on the flimsiest pretext and sued for damages which represented the full value of our property at that time, and the case against us was prosecuted by the principal shareholder in a competitive newspaper which stood to profit by our misfortunes.

It has been a screaming joke on us for over five years; in the following articles we return the compliment.

FOR a long time the existence of a super-extra-territorial American government in China has been suspected by those upon whom its secret mandates have been enforced. The working of this organization has been felt not only throughout China but in the home press, in the halls of congress, in the state, war, navy, justice and commerce departments at Washington and at times even in the executive mansion. As it stands, Americans in China are singularly blessed with all the legal machinery of government. There is a minister at Peking and consular officials throughout the country to protect their interests under the direction of the department authorized to conduct our foreign relations and enforce the treaties. There is a commercial attaché at Peking with wide powers. Under him are a trade commissioner and a registrar of China trade act companies in Shanghai. This useful organization reports direct to the department of commerce at Washington. There is a United States court for China sitting at Shanghai with its judge, commissioner, district attorney, marshal and clerk. An independent army command is stationed in North China under a brigadier-general acknowledging the direction of the secretary of war. In addition, there are the legation guards under command of a colonel of marines reporting to the navy department. A unit of our Asiatic fleet, known as the Yangtze patrol, is commanded by a rear-admiral directly responsible to the secretary of the navy through the commander-in-chief of the

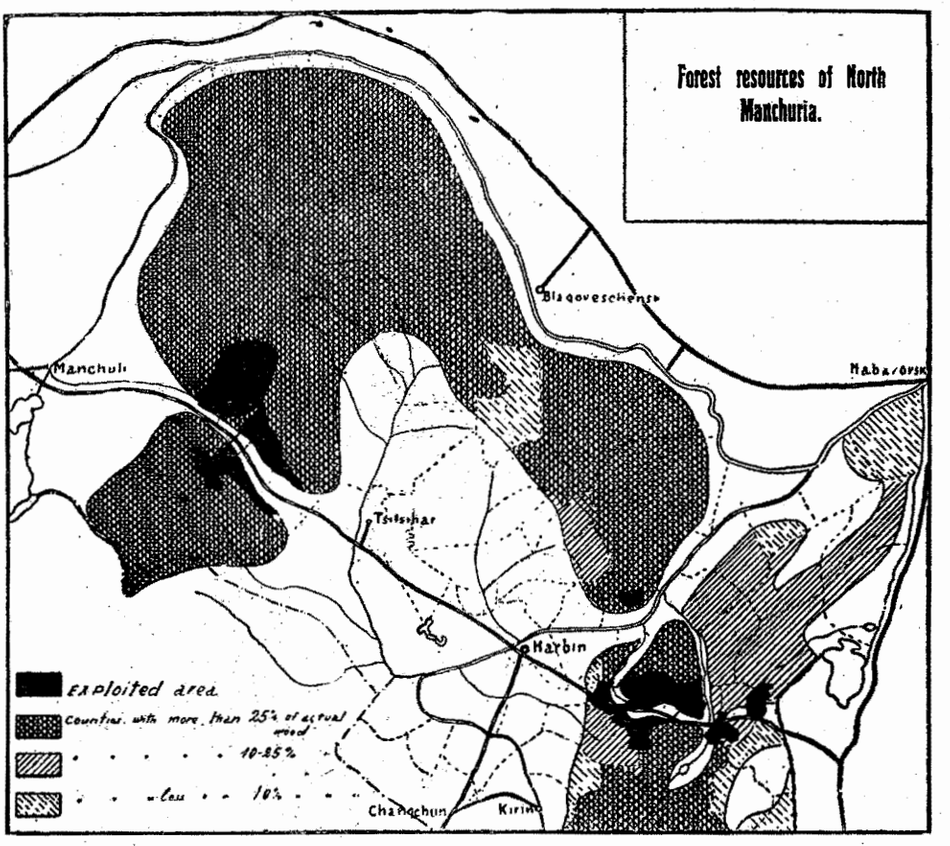
The Chinese Eastern Railway and Its Zone

Forestry and Mining

ACCORDING to official sources the reserve stock of timber in North Manchuria is estimated at 136 billions of cubic feet. Out of this quantity only one thirty-fourth part (four billions) is actually exploited.

In former days the whole territory of North Manchuria was comparable to "a Sea of trees." Proof hereof is contained in the name given to the country in the Tunghus dialect, wherein it is named "Votsi" the meaning of which is "Forests."

After the construction of the Chinese Eastern Railway and the enforced colonization of the country, forests were gradually logged, but only in districts in the vicinity of the railroad.



Actually the forests of North Manchuria assume the form of an enormous arch, extending from the confluent of the Shiks and Argun rivers to the southeast—towards the Sungari river, crossing the same in the area of the city of Sansing; and, maintaining their original direction in Kirin province, they merge with the woodlands of South Manchuria and Korea near the sources of the Sungari and Yalu rivers. The southwestern end of the arch is continued by a broad strip of forests, stretching through Barga southwards to the chain of the Great Khingan range.

The forests of both Heilungchiang and Kirin provinces possess enormous reserves of timber for building and for fuel purposes, which are estimated at 136 billion cubic feet. The most important forest districts, where logging is actually carried on, are the following—the eastern line of the Chinese Eastern Railway, the western, or Khingan zone, and the lower Sungari zone, lying at a distance of from 200 to 300 kilometres from Harbin, down the course of the Sungari river.

The eastern forest zone is of the greatest importance in the local timber industry. It stretches along the railway line from Harbin to Pogranichnaia (Suifenho) between the stations of Hsiaolin and Silinkhe. The intense work of this eastern zone is caused by the richness of its most valuable tree species, which are the cedar, Ayan pine, nut-tree, velvet tree, lime tree, maple and others, and also by the nearness of the zone to the most important timber markets of Harbin and Changchun. The western (Khingan) zone is at a very great distance from these markets and abounds only in larch trees, yielding excellent material for special requirements, and in birches, which are used for fuel.

In the eastern zone there are situated the largest forest concessions of the Chinese Eastern Railway Company, and of the following timber merchants: Skidelsky, Kovalsky, Popoff, Shevchenko, Slinkin, and others. The concessions are equipped with railway feeder lines, they are well organized, and a few of them possess sawmills.

The most important concessions in the Khingan forest zone, stretching over a length of 300 kilometres from Niantsienshan station to Yakeshi station, are owned by Vorontsoff Bros. (Yakeshi), Shevchenko Bros. (Horgo and Irekte), Liu-ta-tsai (Puhetu) and Ma. This area produces fire-wood, larch wood sleepers, telegraph poles and supporting stanchions for mines.

From the lower Sungari zone less than 55,000 tons of products of the timber industry are brought to the railway, though as a whole the named zone supplies to woodless districts about 600,000 tons of timber, which is rafted on the Sungari river.

About 85 per cent. of fire-wood and timber building materials prepared at the concessions, were used in 1921 by the Chinese Eastern Railway for its own needs and only 15 per cent. were carried under commercial tariff rates for requirements of the local market and for export abroad.

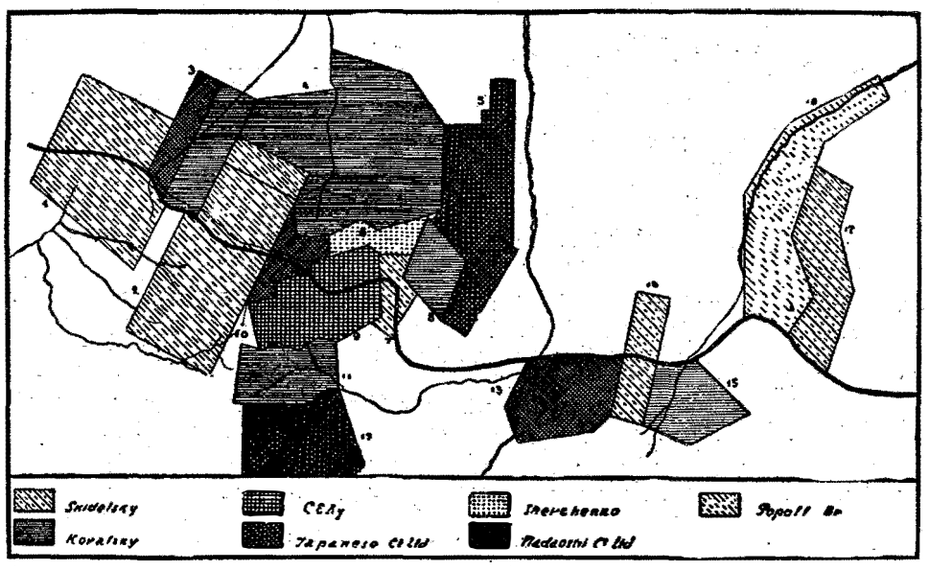
In 1922 already 37 per cent. were put upon the private market. Exports moved almost exclusively in the southern direction and amounted to 114,000 tons in 1922.

Manchurian timber has excellent opportunities for conquering foreign markets to a larger extent; however, in order to arrive at such result, it would be necessary to introduce a number of measures for improving timber industry in North Manchuria.

North Manchuria is very rich in mineral deposits: gold, various ores, natural soda, etc. However, so far only the output of coal, building stone and lime is of any industrial importance.

The total requirements of North Manchuria in coal during these last years amounted to about 500-600,000 tons, out of which quantity 500,000 tons were carried by the Chinese Eastern Railway. In the nearest future this consumption is liable to increase considerably.

In districts more accessible for logging operations in North Manchuria forests have been depleted and are moving away from the railway line, causing thereby a high price of fire-wood. For this reason the Chinese Eastern Railway has already started to replace wood-fuel by mineral fuel. 50 per cent. of the requirement of coal fuel are covered by local coal, almost exclusively of Chalainor origin, the remaining 50 per cent. are imported from abroad. The output of coal from the Chalainor mines numbers about 300,000 tons per annum on an average.



Map of the Eastern Concessions

Other coal deposits in North Manchuria have a very small output, viz., mines on the Hankhe river near the city of Mergen, and mines near Bukhai station of southern line. All these deposits yield only a low grade coal. The coal deposits at Matsiaokhe (100 kilometres from Matsiaokhe station) possessing an excellent coal, may have a very promising future. However, to work the same, it would be necessary first to obtain the concession required and to lay a feeder line over a stretch of 125 kilometres.

From outside markets 250-300,000 tons of coal are imported into North Manchuria. The bulk of these imports consists of South Manchurian Fuchun coal. The other kinds of coal, such as coal from Suchan, Karanor, Tchernoff and Tcheremkhovo, were imported from Russian territory in comparatively small numbers. Lately these imports have again begun to grow considerably.

Industry

Manufacturing industry in the country has by far not yet reached its due development. It is concentrated at the cities of Harbin and Fuchiatien, where all branches of industry existing in North Manchuria are represented, with the exception of wool-washing plants. The turnover of Harbin by far exceeds the turnover of all points on the railway line, taken together. The yearly turnover of industrial enterprises in North Manchuria of foreign (European) type is estimated at 25 million gold dollars.

Steam flour mills in the railway zone transform 300,000 tons of wheat.

The first place in manufacturing industry is taken by flour-milling. There exist in all 35 flour mills in the concession zone of the Chinese Eastern Railway, which mill up to 300,000 tons of wheat. 24 of these mills are situated in Harbin, and nine are at different points on the railway line. Besides flour, the local mills produce manna and buckwheat grits, they husk buckwheat and millet.

Out of the flour produced, about two-thirds are brought to the Chinese Eastern Railway and the remaining one-third is consumed directly at the points, where the mills are located, or is exported by river.

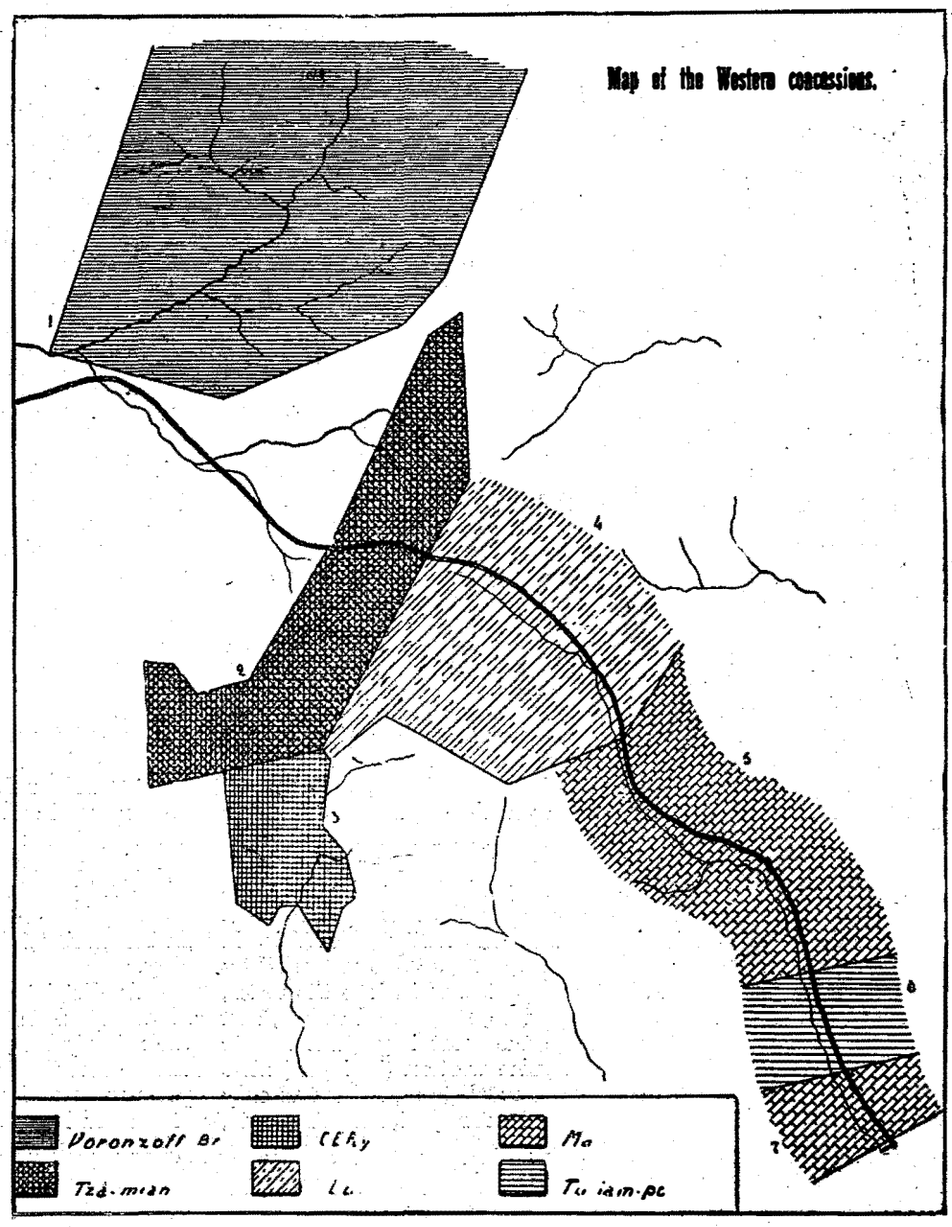
During the last year the oil-milling industry has largely developed in North Manchuria and is looking forward to a good future.

Oil-milling ranges second in importance among the branches of industry in North Manchuria. The country possesses more than 1,000 native mills and 56 steam mills, 45 of the latter are located at Harbin and the remaining ones are at various points of the railway line.

The value of the output from oil-mills equals about half of the value of products of flour mills. Bean-oil and bean-cakes are in great demand on both the interior and the foreign markets. Exports of bean-oil and bean-cakes are made partly to Europe and mostly to Japan. These products are not demanded in Russian territory, and for the Russian maritime province they have only the importance of providing export shipments to the Ussuri railway.

With the exception of the two above-named branches of industry, all other kinds of manufacturing industry take only a modest place in the economical life of the country.

In the first place should be mentioned alcohol distilleries, which transform up to 120,000 tons of grain a year. Out of the seven existing distilleries only one is locatest outside of Harbin—at Fuliaerhti. Beat-sugar factories are at Ashiho and Harbin leather factories—at Hailar, Manchouli and two at Harbin. A number of other industries should be mentioned: soap-factories, candle factories, molsses-factories, macaroni-vermicelli factories, tallow-melting plants, etc.

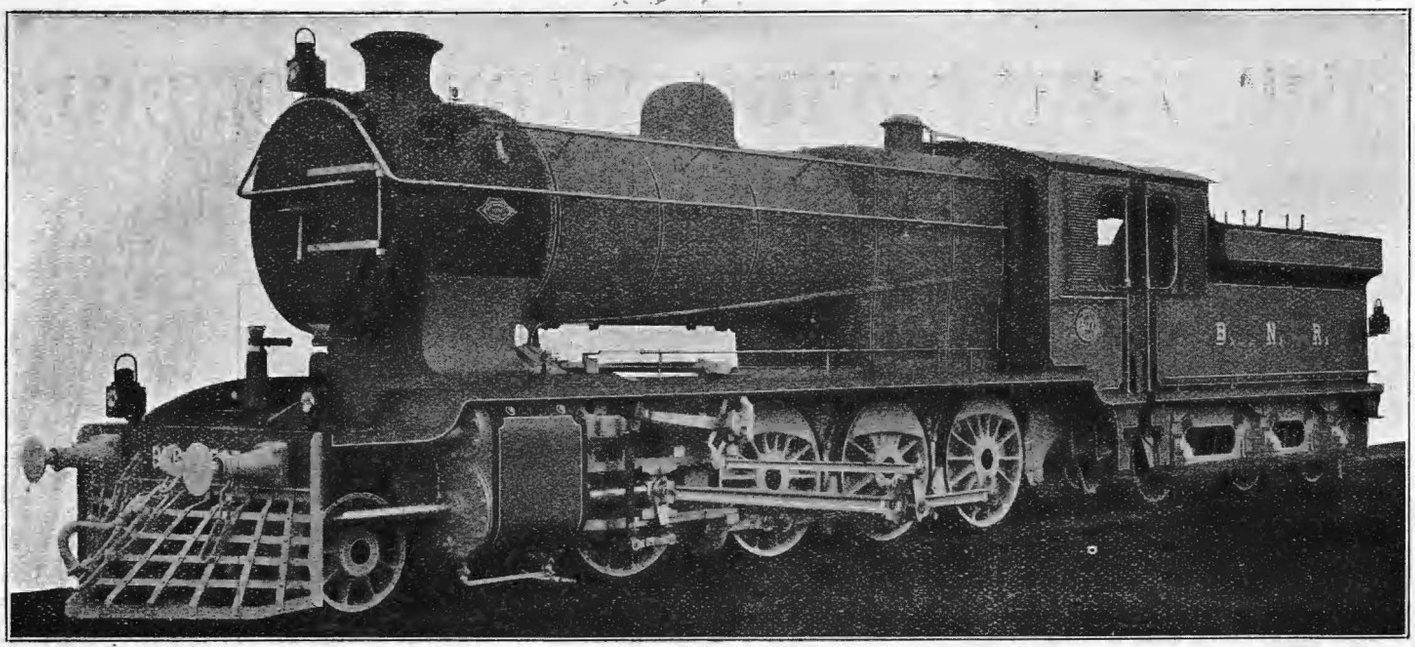


ASSOCIATED BRITISH LOCOMOTIVE MANUFACTURERS FOR CHINA

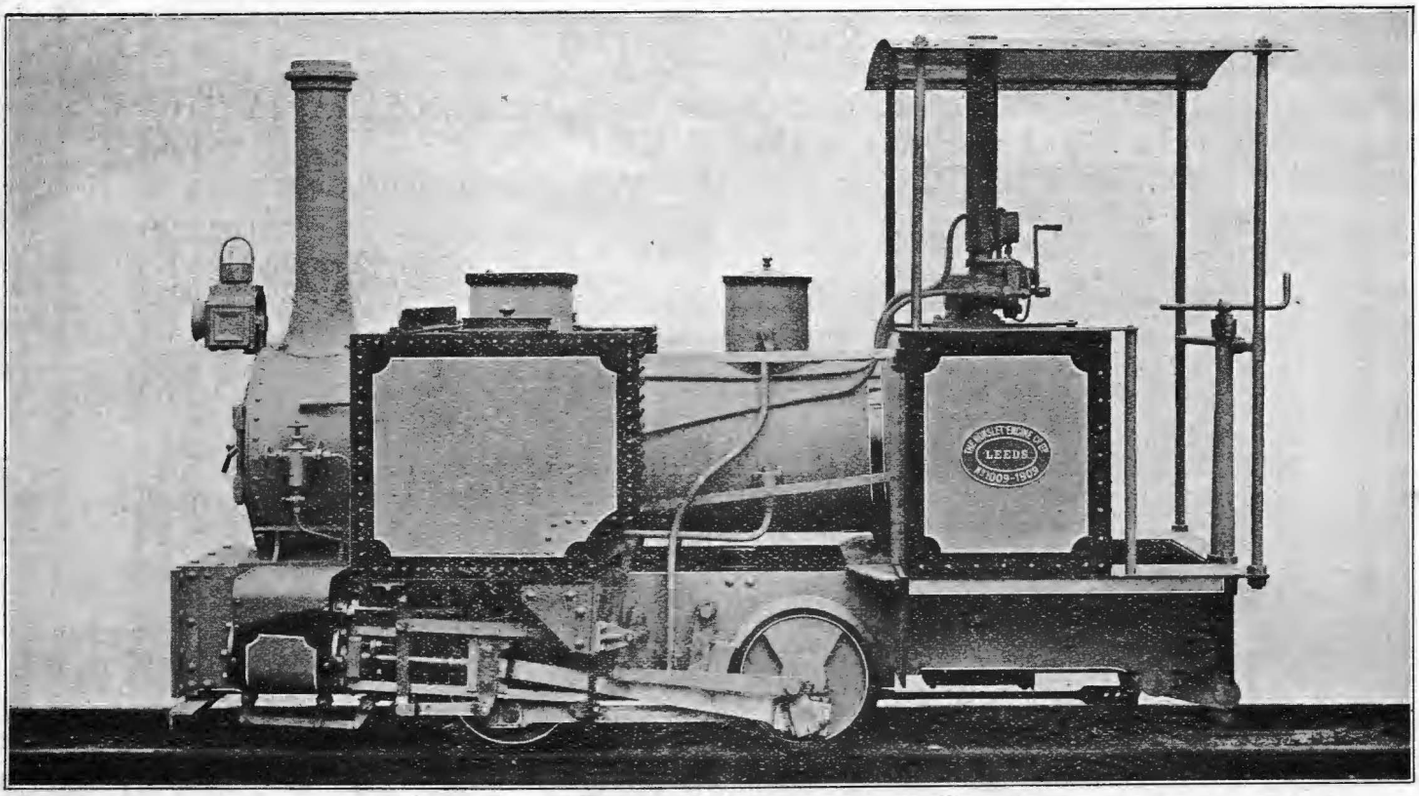
Head Office:
7 HOBART PLACE
GROSVENOR GARDENS
LONDON

TEL. ADDRESS: REBRITMAN, PEKING

Agents in China:
REPRESENTATION FOR
BRITISH MANUFACTURERS LTD.
46 WAI CHIAO PU CHIEH
PEKING



ANDREW BARCLAY SONS & CO., LTD.
THE AVONSIDE ENGINE CO., LTD.
W. G. BAGNALL LTD.
BEYER PEACOCK & CO., LTD.
HAWTHORN LESLIE & CO., LTD.
HUDSWELL CLARKE & CO., LTD.
THE HUNSLET ENGINE CO., LTD.
KITSON & CO., LTD.
NASMYTH WILSON & CO., LTD.
THE NORTH BRITISH LOCOMOTIVE CO., LTD.
ROBERT STEPHENSON & CO., LTD.
THE VULCAN FOUNDRY, LTD.
THE YORKSHIRE ENGINE CO., LTD.



AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

THE DAI-ICHI GINKO, LTD.

(FORMERLY THE FIRST NATIONAL BANK)

ESTABLISHED 1873

Subscribed Capital - - -	**Yen 50,000,000.00**
Paid-Up Capital - - - -	**Yen 43,175,000.00**
Reserve Funds - - - -	**Yen 40,000,000.00**

Y. SASAKI, *President*

K. ISHII, *Managing Director.* Y. NOGUCHI, *Managing Director.* S. SUGITA, *Managing Director.*

HEAD OFFICE:
No. 1 KABUTO-CHO, NIHONBASHI-KU, TOKYO.
T. AKASHI, *Manager*

CITY BRANCHES:
ISECHO, SHIN-OSAKACHO, FUKAGAWA, MARUNOUCHI, KYOBASHI.

HOME BRANCHES:
YOKOHAMA, NAGOYA, TAMAYACHO (NAGOYA), YOKKAICHI, KYOTO, NISHIJIN (KYOTO), GOJO (KYOTO), FUSHIMI, OSAKA, NISHIKU (OSAKA), MINAMIKU (OSAKA), HONMACHI (OSAKA), KOBE, HYOGO, KYOMACHI (KOBE), HIROSHIMA, SHIMONOSEKI, CHOFU, MOJI, KOKURA, FUKUOKA, KURUME, KUMAMOTO, HAKODATE, OTARU, SAPPORO, MURORAN.

BRANCHES IN COREA:
SEOUL, FUSAN.

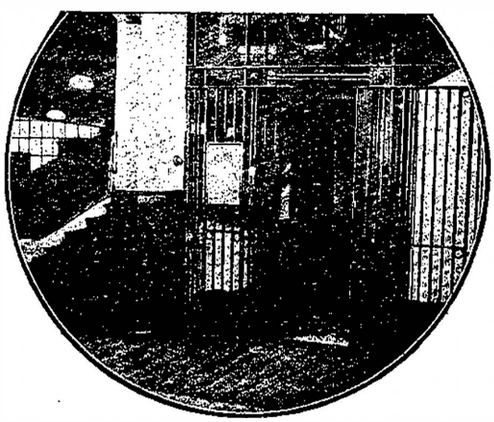
LONDON & NEW YORK BANKERS:

London { Westminster Bank, Ltd. / Midland Bank, Ltd. / The Yokohama Specie Bank, Ltd.

New York { The National City Bank of New York. / The National Bank of Commerce in New York. / The Yokohama Specie Bank, Ltd.

CORRESPONDENTS:
The Bank, in addition to its own Branches, has numerous Agencies or Correspondents in the principal Cities and Towns at Home and Abroad.

E.C.M. LIFTS



E.C.M. Lifts—electric or otherwise—achieve a degree of efficiency which makes the users regard their cost as a real investment in property. Working drawings and full instructions for erection are sent with overseas installations.

ETCHELLS, CONGDON & MUIR, Ltd.
MILL STREET, ANCOATS,
MANCHESTER, ENGLAND

The Chinese Eastern Railway

issues in the middle of 1924 a book, in the English language, entitled

"NORTH MANCHURIA AND THE CHINESE EASTERN RAILWAY"

which will give a thorough picture of all branches of the economic life of North Manchuria.

The book is to contain about 700 pages in octavo and will be printed on a high quality paper stock. It will be profusely illustrated with schemes, maps, diagrams and photographs.

Advertisements and subscriptions to the book are accepted up to the month of June at the following rates:—

Full page before reading matter ...	Mex. $200.00
Full page after reading matter ...	100.00
Half page after reading matter ...	60.00
Subscription price for the book in bound form	12.00

The price of the book will be increased when the book is published.

Advertisements and subscriptions are accepted by the Economic Bureau, Chinese Eastern Railway, Harbin, North Manchuria, China.

大正七年七月十日第三種郵便物認可

Chinese p. 181
Tibet Question pp's 155-157

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

FAIRPLAY FOR JAPAN

After Excluding Japanese from America, Affronting their Government, Driving their Shipping from the Pacific and Opposing their Vital Policies in Manchuria, where will Japan find an Outlet?

AN AMERICAN SPHERE IN CHINA
"TOMMY ATKINS" IN TIBET
GET BEHIND "BILL" CAREY

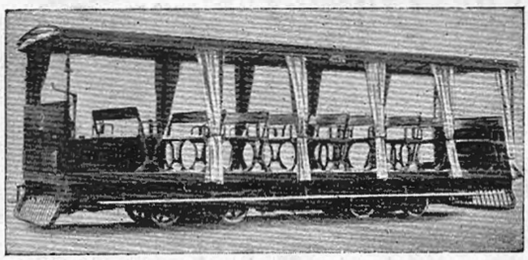
AUTOMATIC TELEPHONE IN CHINA
ELECTRIC LOCOMOTIVES IN JAPAN
FUSHUN OIL SHALE PROJECT
SINGAPORE TRAMWAYS
CHINESE WOOD OIL
RAMIE
NEW CEMENT PLANT

Vol. XX April, 1924 No. 4

A. L. TAYLER

SHANGHAI, PEKING, TOKYO AND MANILA

INTERNAL COMBUSTION. LOCOMOTIVES



Bogie Tram Car to seat 34 passengers.

ALL THE WORLD OVER
BY

RAILWAY MOTOR CARS

THE DREWRY CAR Co., Ltd.

COACHES

AND

McEWAN PRATT & CO., LTD.

River Plate House, South Place, London, E.C.2.

TRAMCARS

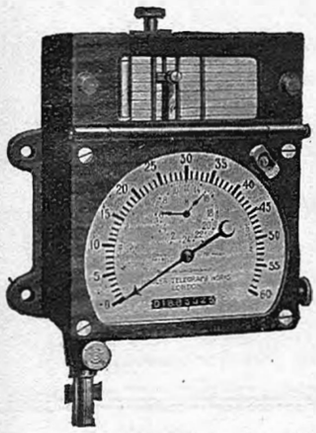
Works: BURTON-ON-TRENT, ENGLAND

Telegrams: "EFFERVESCE LONDON"

ETC.

Contractors to the Admiralty, The War Office, India Office, Crown Agents for the Colonies.

THE BEST LOCOMOTIVE SPEED INDICATORS & RECORDERS



WITH CONJUGATE MOVEMENT

TELOC TYPE

Chart Feed on a Mileage Basis of 10 m/m per Mile.

INDICATES:—Speed.
Total mileage since application of Instrument.
Total mileage of each run.
Time of Day in Hours and Minutes.

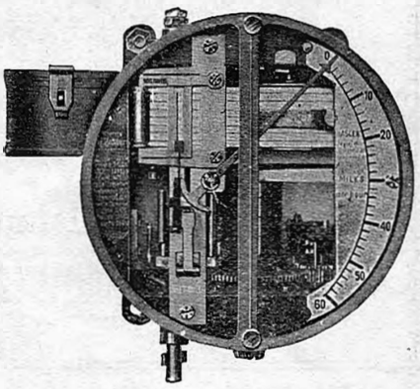
RECORDS:—Speed attained at any point of run.
Time the engine or coach is at work.
Distance covered.
Duration (up to 24 hours) and point of stops.
Time of Day in Hours and Minutes.
If desired apparatus to record working of Westinghouse or Vacuum Brakes.

HASLER TYPE

Chart Feed on a Time Basis of 4 m/m per Minute.

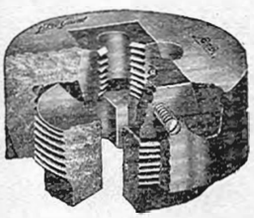
INDICATES:—Speed.

RECORDS:—Speed attained at any point of the run.
Time the engine or coach is at work.
Distance covered.
Duration and point of stops.
If desired bell can be fitted to ring at predetermined speed, or apparatus to record working of Westinghouse or Vacuum Brakes.



HASLER TELEGRAPH WORKS, 26 VICTORIA STREET, LONDON, S.W. 1

Agents in China: WILLIAM FORBES & CO., PEKING



Collet Complete

Cap

Guide

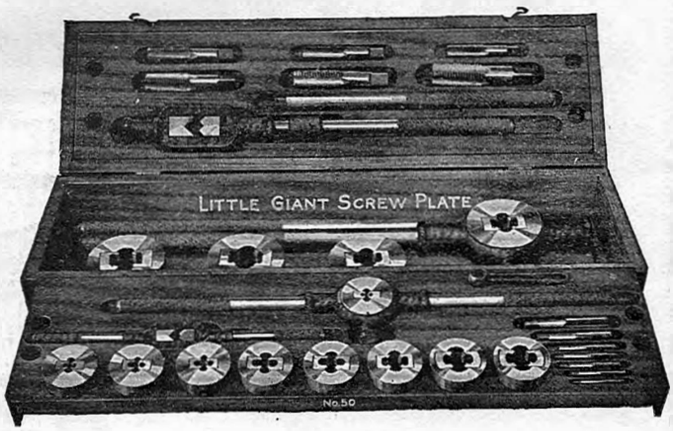
"Little Giant" Die

Little Giant Screw Plates

For 40 years "*Little Giant*" Screwing Tackle has been known and sold all over the world. "*Little Giant*" is the sign of quality wherever screw plates are used.

We manufacture hundreds of different assortments to fit every need. Cutting sizes range from 1/16 inch to 1 1/2 inch. We furnish Whitworth or United States Standard threads as may be desired.

For detailed information we respectfully refer you to our representatives, whose names are given below.



GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

London Office: 139 *Queen Victoria St.*

Greenfield Tap & Die Corporation of Canada, Ltd., Galt, Ont.

GTD Screw Plates, Taps, Dies, Reamers, Gages, Pipe Tools, Twist Drills, Milling Cutters

REPRESENTATIVES:

JAPAN.

MULLER, PHIPPS & SELLERS, LTD.
Room No. 758 Marunouchi Building, Tokyo
(Central P. O. Box 98)

MULLER, PHIPPS & SELLERS, LTD.
Dojima Building, Osaka
(Central P. O. Box 63)

HORNE COMPANY LTD.
6-7 Takayama-cho
Kyobashi-Ku
Tokyo, Japan

CHINA.

MULLER & PHIPPS (CHINA) LTD.
5 Ice House St.
P. O. Box 25, Prince's Bldg., Hongkong, China

2 Canton Road
Shanghai, China

Kinta with light, but it will also be possible to supply the new port at Prai. Indeed, with the coming of a really large hydro-electric installation on the banks of the Perak River, there should arise many electrifications besides that which will make the Kinta Valley one huge tin mine. It might mean that trams would be run between Ipoh and near-by townships; and the possible linking of Ipoh and Lumut by an electric railway, with the development of Lumut as a port.

* * *

American Economic Interest in Tropical Asia

Last year the United States sold $49,691,877 worth of its products—largely manufactures—to India and Malaysia (including British India, Straits Settlements, and Dutch East Indies). The year before we sold $43,456,210 worth to these countries. In that same year, however, these countries bought approximately $728,000,000 worth, principally of manufactured products, from Europe.

The things we sold them were chiefly manufactures in which we specialize for export, including automobiles, machinery, iron and steel products, hardware, electrical apparatus, machine tools, typewriters, etc. The demand for such products, however, only came after their demands for the necessities which Europe sold them had been satisfied.

Cotton goods constitute one-third of the normal imports of these countries year in and year out. We scarcely participate in this trade. Dyestuffs, for cotton goods locally manufactured in India, form an important demand from abroad. Generally speaking, we do not compete in this field. Chemicals form an important item of European sales, while we get only a small fraction of the trade. Great Britain sells India twice as many boots and shoes in normal years as we do.

Our product is as good as, and in many instances it is better than, the European. Our prices are too high, however, and we have not the requisite organization to sell the product on its quality. We simply permit it to be bought. If it will not sell itself we seek other markets.

In 1922 these countries sold $1,860,000,000 worth of their products to the world and bought $1,474,000,000 worth of goods. The trade of the Dutch East Indies and Straits Settlements was practically balanced between exports and imports. The trade of India, however, showed an excess of exports of $369,000,000. This came about by excess sales to the United States of $70,000,000, and to countries in the Far East, Latin America, and Africa of $378,000,000—a total of $458,000,000, which was reduced $89,000,000 by excess purchases from Europe. This "favorable" merchandise balance of India's trade was liquidated in 1922 by net imports of gold and silver amounting to $382,000,000. This does not remain in circulation, but is melted down and hoarded by the people. By the modern alchemy of commerce, India is turning jute, tea, cotton, oilseeds, and other agricultural products into silver and gold.

The problem confronting those manufacturers who would sell more of our specialties to this region, therefore, is simply one of turning this precious metal into better roads, to encourage purchases of more automobiles; into factories making low-priced necessities, to encourage purchases of more machinery and machine tools; into railroads and buildings, to use more steel products; into electric power plants, to open markets for more electrical apparatus; and into greater literacy, to increase the demand for typewriters. Our whole economic policy in this region should be directed toward higher standards of living and the productive investment, instead of the hoarding, of wealth.—FRANK R. ELDRIDGE.

* * *

The S.M.R. Solves Japan's Oil Problem

THE Japanese are always doing something worth while in Manchuria. After inventing a special reduction process that will solve the problem of working at a profit the low-grade iron ores of Anshan and drawing up plans for the erection of a new reduction plant and a 200,000-ton steel mill, they have turned their attention to the development of the shale deposits at Fushun from which an inexhaustible supply of petroleum can be obtained. The extraction of oil from shale has generally proved a failure as a commercial proposition, the only single exception being in Scotland. Here, according to the latest reports from England, there is considerable apprehension amongst the workers that the industry may be summarily closed down owing to the unsatisfactory financial position of the industry, as revealed in the report of Sir Charles Greenway, chairman of the Anglo-Persian Oil Company. The president of the board of trade, however, has assured the workers there is no immediate danger of the industry reaching a position where the question of closing down would arise.

The South Manchuria Railway Company has pinned its hope on the success of the Scotch industry and have carried out experiments in conjunction with the Japanese naval authorities which have proved quite satisfactory. From these experiments it is calculated that about 79,000,000 gallons of petroleum per year can be profitably extracted from 2,000 tons of shale per day. The oil shale at Fushun is found in the upper strata and at least two thousand tons per day have to be removed to get at the coal. In other words, the shale is obtainable practically free of mining cost, while the ammonia sulphate and the other by-products will help to make the enterprise profitable.

Mr. Kawamura, president of the South Manchuria Railway Company, is now in Japan conferring with the naval and finance authorities as to the best means of raising the capital required for installing the plant. It is estimated that some Y. 50,000,000 will be needed to cover equipment expenses over a period of three years. It is understood that in the conferences with the home authorities, the South Manchuria Railway Company has agreed to furnish the capital, and in the first year appropriate Y. 10,000,000. The company's budget for the new fiscal year is fixed at Y. 49,000,000, an increase of Y. 25,000,000 over the previous year. The plan having been approved by the home government, only the question of raising the capital remains to be solved. It is hoped that the imperial authorities will join in the enterprise and appropriate Y. 10,000,000 towards the cost of installation.

The Japanese navy uses about 500,000 tons of petroleum per year and steamship and other private enterprises, another 300,000 tons. It is pointed out that the home production of petroleum is small and with America restricting exportation, the Japanese navy and industries will soon face a serious shortage of fuel. It is estimated that the Fushun shale will supply the home requirements to the extent of at least 400,000 tons thus relieving the strain and assuring to Japan an oil supply that will place her in an independent position in case of emergency.

* * *

Chinese Machinery Market Contracted

By W. H. Rastall, Chief Industrial Machinery Division, Bureau of Foreign and Domestic Commerce

Supplementing article "Competition for Machinery Trade of China," appearing in the March Number of "THE FAR EASTERN REVIEW."

THE Chinese machinery market, so far as the Shanghai business is concerned, contracted substantially in 1923 from the previous year, according to cabled information from Commercial Attaché Julian Arnold at Shanghai.

The value of all machinery imports into Shanghai amounted to 12,900,000 haikwan taels in 1923, as compared with 26,601,000 haikwan taels in 1922.

The figures for the various kinds of machinery imports follow:

The above figures show that during 1923 the imports of textile machinery into Shanghai decreased to about one-third of the value of the previous year; and that electrical and certain other classes of machinery declined to less than one-half the value of the 1922 imports. Propelling machinery and the miscellaneous groups, however, maintained, and even slightly increased, their volume.

Shanghai Percentage of Total Imports

In 1910, machinery imports through Shanghai were about one-sixth of the total imported into China; but since 1920 Shanghas received more than one-half of the total, according to final figures of the Chinese customs. (The figure for Shanghai imports

Pullman Express Train on the Chinese Eastern Railway

The Chinese Eastern Railway

Notes on its Working Results

AS a result of the economic crisis following the war and the Russian revolution, the Chinese eastern railway was transformed from a trans-continental trade artery connecting Europe with the Pacific to a purely local line relying for its existence upon the export of Manchuria cereals and a limited importation of general cargo for the requirements of its own zone. Before the revolution the line enjoyed a liberal subsidy and support from the Russian government who also directed its economic policy. With the advent of the Soviet *regime* it was thrown entirely on its own resources and was forced to devise a new operating program and adjust itself to changed conditions.

In a recent report of Mr. Ostroumoff, he says that during 1920, the year previous to his taking over the management, new industrial enterprises sprang up in the railway zone, trade and industry flourished and commercial transactions increased, all of which was reflected in the volume of freight handled by the line. This activity, however, was a direct result of the fall in the value of the rouble causing commodity prices to soar to unheard of levels. Exchange was favorable and fortunes were made in a day. Bills of lading issued by the railway passed through many hands. The boom attracted an ever increasing number of buyers and wild speculation was the order of the day. The higher the railway raised its freight rates, the public refused to be alarmed, for although the rates were quoted in gold roubles they collected in Romanoff, Kerensky and Siberian bank notes which gradually lost their value. This fever of speculation was also taken advantage of by many to unload their hoards of paper money.

When the bottom fell out of the rouble in 1920 and the railway insisted on hard currency in payment for frieght, a financial catastrophe followed. Bankruptcies were common. Millionaires became beggars overnight. The evil effects of this year are felt even to the present time. This occurred just prior to the change in the management of the road, which took place in February, 1921.

The business of the line was in chaotic condition. The employees had lost all sense of discipline, duty and responsibility. The line was being operated only on the Harbin-Changchun branch, the traffic towards Vladivostok being almost nil, as only 3,000,000 poods of freight had been transported in this direction during 1920, an average of 10 cars a day. There was no communication westward towards Manchuli. Through communications with the Chinese and South Manchuria railways had ceased. Trains were operated with great delays. The cars were dirty, neglected and lacking in even elementary comforts. There was only one train with decent rolling stock.

The goods rolling stock could not meet the heavy demands. The number of cars per train were small, speed was impossible, so the inevitable Chinese cart captured the business. During 1920, 60,000,000 poods of freight were carted from the C. E. zone to Changchun, or about 55 per cent. of the total grain production of the country.

The number of engines was inadequate. Repairs were made without reference to cost. Trains were frequently disconnected by the breaking of couplers. Hot boxes and blazing axles were a constant occurrence. The costs of fuel and lubrication were excessive. The railway administration was completely cut off from contact with the line, which was operated by the employees without system, routine or accounting.

Maintenance was expensive and carried on without any regard for the administration. Buildings and other structures had not been repaired or painted for years, while those which had been destroyed or damaged by fire were never rebuilt. All buildings, those in Harbin included, were indescribably filthy and required extensive repairs. The road houses were in a deplorable condition.

The inability of the railway to meet the traffic requirements during 1919 and 1920 resulted in the accumulation of huge masses of cargo at all stations. Shippers had the greatest difficulty in obtaining cars or space. To meet this situation the railway employees put into practice the plan of selling cars, and even whole trains to shippers at excessive rates in hard currency, which sums were not turned into the administration offices. Great sums were lost to the railway through this practice, as to date no satisfactory audit is possible.

Materials were purchased against hard cash, and at an exchange most unfavorable for the railway. Firewood reached 55-58 gold roubles per cubic sagen (about $11 gold per cord) while coal from the railway's own mines at Djalainor cost 35 gold copecks per pood (or over $11.00 gold a ton). Free competition in tendering for supplies was waived and the railway became the prey of a contractor's monopoly which fixed its own prices for commodities.

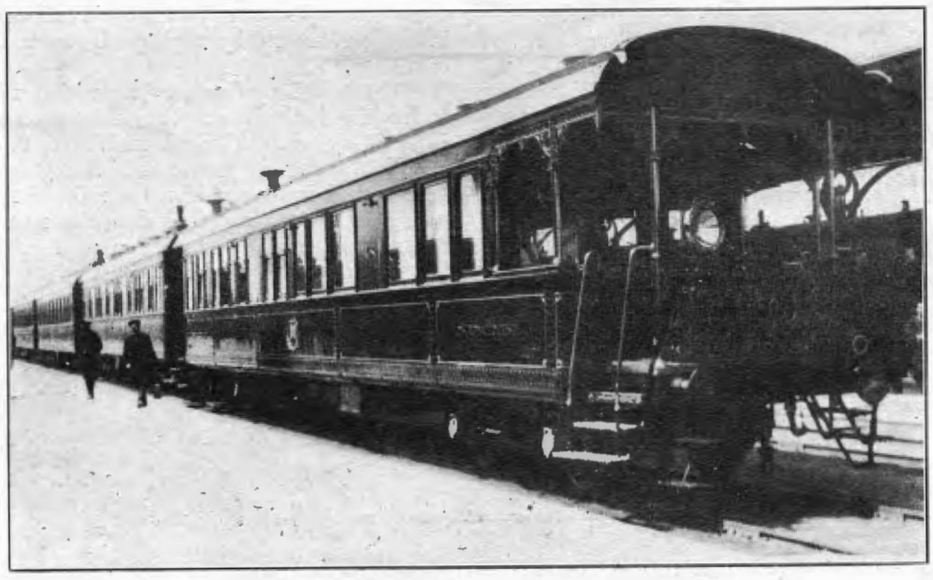
When the railway enforced the payment of rates in gold roubles in December, 1920, the traffic fell to 2,565,700 poods. In January, 1921, this increased to 3,856,382 poods and in February to 4,381,975 poods. In one year or by December, 1921, 12,081,211 poods were carried: 9,383,373 poods in January, 1922 and 5,658,848 in February.

It was obvious from these figures that freight rates had been maintained at too high a level and that a continuance of such rates would lead to suspension of traffic. A reduction in rates was therefore made in March 1921, which resulted during the year of raising the total volume of traffic to 127,000,000 poods, of which over 26,000,000 were consigned to Vladivostok. In 1922, the line carried, 152 million poods (50 per cent. more than in 1921) of which 37,000,000 poods went to Vladivostok. The first half of 1923, showed 98,500,000 poods of which over 28 million went to Vladivostok. With the reduction in freight rates, the administra-

tion undertook to decrease the operating expenses which in 1920 amounted to 47,019,208 roubles. In 1921 this was reduced to 32,420,216 roubles, in 1922 to 27,500,000 roubles, while in 1923 it was expected to bring it under 26,000,000 roubles.

The report of 1921 shows that after allowing for all the vagaries of exchange, the net operating income was equal to 7,365,460 gold roubles against 6,400,702 gold roubles for 1913-14. In 1922 it was 9,030,000 roubles and for the first half of 1923, 5,182,836 roubles. In comparing these working results, Mr. Ostroumoff says that the line under his management enjoyed a prosperity equal to if not greater than its pre-war days, despite all economic and political problems, lack of through cargo and other drawbacks. In other words, it proved its value as a purely local line dependent upon the districts served for its business, all of which he declares, is due entirely to his policy of reducing freight rates. When he took over the management of the line in 1921, the first problem was to open the line for exports to Vladivostok, at which port the C. E. R. owns the splendidly equipped Egersheld wharves, and in the course of the year the results above-mentioned were obtained, while goods traffic on the western section was resumed in a small way.

Mr. Ostroumoff dwells on the various problems confronting the C.E.R. in its relation to the S.M.R. The Japanese line for a long time protected the native cart traffic which brought the produce of northern Manchuria to its Changchun terminus, thus depriving the Harbin-Changchun branch of the C.E.R. of much valuable traffic. After several conferences an agreement between the two lines was arrived at by establishing the principle of equal tariff rates for grain shipped over the Southern C. E. line to Dairen and from the same line to Vladivostok. This, however, did not materially change the situation for the C.E.R. for the reason that the trade of the district served by its Harbin-Changchun branch gravitates naturally towards Dairen. However, grain exports via Vladivostok increased under the agreement from 23.4 million poods in 1921 to 33.4 million poods in 1922 and 26.6 million during the first half of 1923. This was due to the increasing quantities shipped direct from Harbin to Vladivostok without change of gauge and breaking of cargo as is necessary in transhipping at Changchun.



Observation Car on Express Train of the C.E.R.

Any great increase in these through Vladivostok shipments are however hindered by the capacity of the Ussuri railway between Programchnaya and Nikolsk on which not more than 15 trains per day can be operated, due to the exceptionally heavy grades and the limitation of sidings too short to accommodate a full freight train. Another drawback to the profitable operation of the eastern section, is an almost complete absence of import cargo, which compels the return of full rains of empties doubling the operating expenses on the outward shipments.

Working agreements have also been entered into with the Chita section of the Trans-Siberian railway, while the Ussuri railway administration agreed to take part in a direct oversea traffic arrangements to be made with the Robert Dollar Company of America.

Aside from the urgent necessity of reducing the freight rates, Mr. Ostroumoff was faced with the working out of a complete new economic program for the development of the railway and the districts served. Before the Russian revolution when the line was directed from Moscow, its guiding policy was to facilitate through Trans-Siberian shipments. The development of its local traffic was subordinated to the larger interests of Russian trade. In order to draw up a comprehensive program for the development of its own business, an economic bureau was created to gather trade and industrial statistics and its investigations have been published in one large volume, which will shortly appear in English.

A new policy was established in working out tariff schedules, in which many problems have been considered. It was necessary to devise rates that would permit the railway to compete with the cart traffic, especially in the Harbin-Changchun zone. It was also decided to support and protect local milling industries, to build grain elevators and provide for the mixed storage of beans and bean oil, to encourage exports via Vladivostok and attract imports through the same port by conceding advantages in freight rates. Although a definite program has not been worked out, the preliminary measures taken to develop the line have increased the traffic from 102,286,613 poods in 1920 to 151,605,464 poods in 1922 and 98,500,000 in the first six months of 1923, or nearly a hundred per cent. increase in three years. The amount of produce hauled out of the district by carts decreased from 62,000,000 poods in 1921 to 13,000,000 in 1922.

In 1921, bean oil was transported for the first time in tank cars equipped with a heating apparatus for the winter months, while at the Egersheld wharves at Vladivostok special storage tanks were erected from whence the oil is pumped directly into the steamer's tanks. In 1922, the C.E.R. special grain conveyors were being installed at the Egersheld wharves for unloading grain from the cars into storage godowns and from there to the steamers. The expropriation of the wharf by the Soviet authorities have prevented the completion of this much necesasry improvement.

Prices of fuel have been reduced from 58 gold roubles in 1920 to 36 gold roubles in 1922 while coal which cost 33 copecks per pood in 1920 was purchased in 1922 at 12 to 13 copecks. The consumption of firewood and coal was greatly reduced in two years resulting in a saving to the railway of nearly 11,000,000 gold roubles.

Traffic Department

The disorganization of the freight service created an enormous congestion of traffic which called for a radical improvement in the traffic department. By the end of 1923 the speed of passenger trains had been increased from 65 to 77 versts per hour for the southern line and from 50 to 77 versts on the main line, a saving of 14 hours in the running time between Pognanitchnaya and Manchuli. Pullman cars for the three classes equipped with sleeping berths and electric lights have been placed in operation on the mail trains, with a buffet and observation car attached during the summer months. For the expected resumption of through service with Moscow two sets of express trains made up exclusively of Pullman cars are in readiness, while a special "train de luxe" composed of baggage, dining, two first class and a saloon car, supervised by the International Sleeping Car Company is available for private parties. Special two axle private cars are also available for passengers.

A great improvement was also made in the freight service and now averages 18 versts per hour as against 12 versts in 1920. Nineteen sets of large sized American freight cars with automatic brakes have been acquired and the length and weight of trains considerably increased. On some of the sections, freight trains of 70 cars weighing up to 100,000 poods are now operating against a former train of

60 cars weighing 65,000 poods. Decapod engines on other sections are now hauling trains weighing 80,000 poods on other sections where formerly the maximum weight was 65,000 poods. The average train load in 1920 was 16,162 poods and in 1923 over 30,000 poods. In 1920, the railway was using 9,621 cars, with an average of 713 cars loaded per day. In 1922 only 7,572 cars were in use with an average of 784 cars per day. This has permitted the railway to accumulate a large surplus of rolling stock, repaired and in good order for instant use. Considerable improvements have been effected in loading and unloading cars and the losses from claims on damaged or lost goods dropped from 63,000 roubles in 1920 to 26,996 roubles in 1922. The stations have been repaired and comfortable quarters provided for employees and traveling agents.

Though the number of pood-versts has increased the number of employees has been diminished and a reduction on operating expenses achieved. The number of pood-versts in 1920 was 4,116,710,000, with a staff of 3,482 and operating expenses of 398,445 roubles. In 1923, the number of pood-versts was 5,544,013,000, with a staff of 2,317 and expenses of 225,659 roubles.

Rolling Stock

In 1920 the expenses of the locomotive department accounted for 50 per cent. of the railway budget. This was reduced by 1922 to 41 per cent. The number of effective engines was 536, of seven different types, of which 36 per cent. were laid up for repairs. By 1923, the number of engines in bad order was only 17 per cent. of the total. A regrouping of the locomotives on the different sections utilizing their fuel tractive power and increasing the weight of the trains, effected a great reduction in the number in operation. During the export seasons of 1921-22, 281 engines were in service while in 1923 only 181. Up to August 1923, the railway had 110 engines in service with 333 in good order in reserve.

The railway has a total of 610 passenger cars of which half were unfit for service in 1920. At present, about 26 per cent. are unserviceable, with 249 cars in operation and 186 in reserve.

In regard to freight cars, the C.E.R. comes under the general direction of the Russian state railways and does not possess its independent rolling stock, being obliged to use those of the Russian lines. The interchange of cars is effected at Pogranichnaya, car for car, under a special reciprocal agreement. The freight rolling stock of the C.E.R. is therefore not permanent, but partly interchangeable, which leads to difficulties in their upkeep. The total number of effective cars is about 12,000 of which 9,562 belong to the C.E.R. This number is made up of standard Russian Cars with a carrying capacity of 750, 900 and 1,000 poods; American 2-axle cars of 1,200 poods, 4-axle cars of 2,700 poods and gondolas of 3,000 poods. A regrouping of these cars on the various sections has increased the axle load, decreased the number of train cars and the number of trains.

Fuel

The locomotive department consumed about 70 per cent. of all fuel purchased for the line. In 1920, the cost of fuel was 12,000,000 roubles while in 1923 it was reduced to 3,000,000 roubles. This great saving was effected by a lowering of price and a decrease in consumption per unit of work. This was brought about by regrouping of engines; increase of weight of trains to full utilization of tractive power; regrouping of cars: installation of arches and arch tubes on engines; use of firewood and coal in a proportion based on investigations and by paying a bonus to the engineers for practicing economy.

Under this system, and notwithstanding the increased speed of trains the fuel consumption decreased from 0.834 cu. sagens per 1,000,000 gross pood-versts in 1920 to 0.508 in 1923, or 38 per cent.

With other improvements inaugurated in the shops and road houses and by a considerable reduction in personel, the total expenses of the rolling stock department was reduced from 23,705,000 roubles in 1920 to 9,605,000 in 1922, with 5,046,000 for the first seven months of 1923.

The Day of the Automatic Telephone

(Continued from page 166).

by the beginning of next year. Telephone apparatus for these central offices already has been ordered from America and several Japanese concerns, but the order was so large that the goods will not be received until September. At any rate, we are planning to install the automatic telephones as soon as possible."

Before the earthquake Tokyo had 110,000 telephones which were subscribed to by 82,000 persons. As a result of the destruction of 16 telephone offices by the quake, the number of subscribers was reduced to 18,000. In addition to this the long-distance call station situated in the Marunouchi was destroyed completely.

The authorities, however, made a desperate effort to establish communication with other parts of the country immediately following the quake and succeeded in the attempt on the sixth day after the earthquake by using old and imperfect apparatus. In the meantime, work of restoring telephone service in Tokyo had been rushed, and by September 5 about 200 telephones connecting the imperial household department and government buildings were restored.

A Typical Tokyo Exchange

Equipment in the four central offices which escaped fire was damaged by the earthquake. They have been gradually, however, repaired and by September 29 were completely perfected. The long-distance telephone station was not restored completely until December 1. The telephone exchanges now operating are Aoyama, Takanawa, Koishikawa, and Ushigome, all of which are situated uptown. Mr. Shimmyo reports that the Marunouchi centre will be opened on February 10 and the Yotsuya centre March 10.

Special Service Installed

As a measure to meet the immediate need pending the installation of the automatic telephone service, the telephone bureau has been establishing the so-called special telephone service which is somewhat similar to the private exchange in the American telephone system. About 200 subscribers living within three *cho* of a telephone centre who are urgently in need of a telephone service may make an application for the establishment of a sub-centre. The establishment of the sub-centre costs about Y.300 for each subscriber and is to be operated at the expense of the telephone bureau. Thirteen sub-centres already have been established and 65 are authorized. The subscribers are charged the pre-quake rate for this service.

Another emergency measure is the introduction of an improved system of booth telephones, similar to those operating in large railway stations in America. This telephone station is operated by a regular telephone operator with a number of messenger boys. These messenger boys will carry a telephone call anywhere within five *cho* of the place where the station is situated at a charge of 10 sen per call. Fifteen stations of this kind have been established, some of which are situated at the Marunouchi building, stock exchange building, the Ginza and near Kyobashi, and 50 are authorized. Besides these emergency measures the bureau is planning to establish at least 500 public telephones in various sections of the city.

大正七年七月十日第三種郵便物認可

P. CHIERI 1924

THE FAR EASTERN REVIEW

FINANCE ENGINEERING COMMERCE

遠東時報

上海仁記路第五號

"GRAVE CONSEQUENCES"

Japan's Plea for a Nominal Privilege
The Aftermath of Exclusion
American Opinion Scores the Senate

WHAT IS AMERICA AFTER IN THE FAR EAST?
Baron Hikokichi Ijuin

TRAMWAY DEVELOPMENTS IN EASTERN ASIA

ELECTRIC LOCOMOTIVES IN JAPAN
PIPE LINE AT GOPENG
HONGKONG AT WEMBLEY

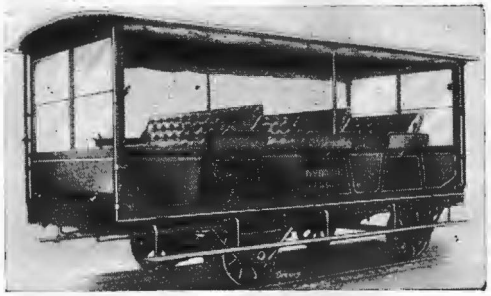
TAIKOO AND HONGKONG & WHAMPOA DOCKYARDS

SHANGHAI PORTLAND CEMENT WORKS

Vol. XX | May, 1924 | No. 5

P. CHIERI 1924

INTERNAL COMBUSTION LOCOMOTIVES



20 h.p. Standard Car

ALL THE WORLD OVER
BY

THE DREWRY CAR Co., Ltd.

AND

McEWAN PRATT & CO., LTD.

River Plate House, South Place, London, E.C.2.

Works: BURTON-ON-TRENT, ENGLAND

Telegrams: "EFFERVESCE LONDON"

RAILWAY MOTOR CARS

COACHES

TRAMCARS

ETC.

Contractors to the Admiralty, The War Office, India Office, Crown Agents for the Colonies.

EXCLUSIVE SALE TO ONE DEALER IN EACH COUNTRY

In 1916 we invented the "Stransky Light" a great improvement in Electric Lighting Fixtures

Reflects a Brilliant Light—no glare Prevents Eyestrain—Saves current
Installed in a minute—no electrical experience required
Made of special illuminating glass Has a patented light magnifier

Sold in large quantities to the U. S. Government, Shops, Railways, etc.

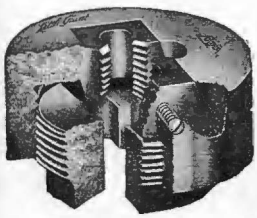
Patented in nearly all countries. We have increased our manufacturing facilities, and have decided to introduce this great invention all over the world.

Each fixture securely packed in breakage proof carton, assuring safe delivery to all parts of the world. Sold at moderate price without bulb. Bulbs can be secured in each country.

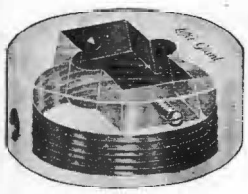
Reference Chase National Bank, Broadway and Pearl New York City, United States of America
Terms: Payment against delivery of shipping documents to Bankers in New York

STRANSKY MFG. COMPANY

261-267 CANAL STREET NEW YORK, U. S. A.



Collet Complete



Cap

Guide

"Little Giant" Die

Little Giant Screw Plates

For 40 years "*Little Giant*" Screwing Tackle has been known and sold all over the world. "*Little Giant*" is the sign of quality wherever screw plates are used.

We manufacture hundreds of different assortments to fit every need. Cutting sizes range from 1/16 inch to 1½ inch. We furnish Whitworth or United States Standard threads as may be desired.

For detailed information we respectfully refer you to our representatives, whose names are given below.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

London Office: 139 *Queen Victoria St.*

Greenfield Tap & Die Corporation of Canada, Ltd., Galt. Ont.

GTD Screw Plates, Taps, Dies, Reamers, Gages, Pipe Tools, Twist Drills, Milling Cutters

REPRESENTATIVES:

JAPAN.

MULLER, PHIPPS & SELLERS, LTD.
Room No. 758 Marunouchi Building, Tokyo
(Central P. O. Box 98)

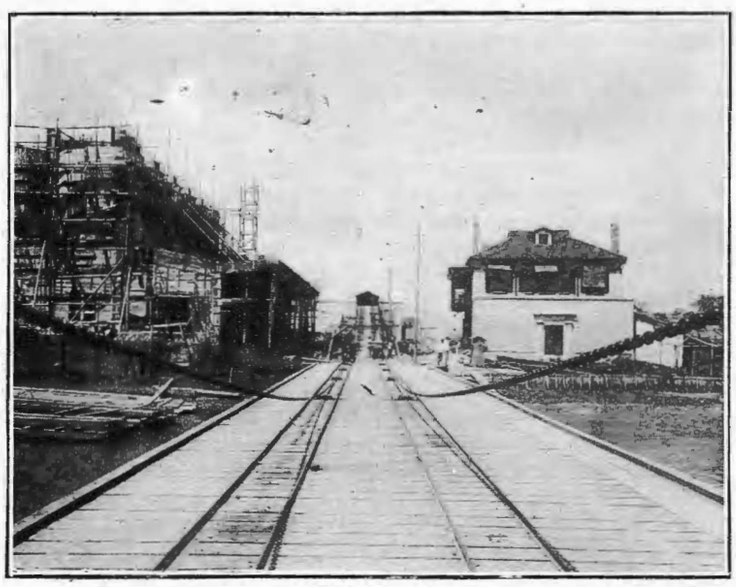
MULLER, PHIPPS & SELLERS, LTD.
Dojima Building, Osaka
(Central P. O. Box 63)

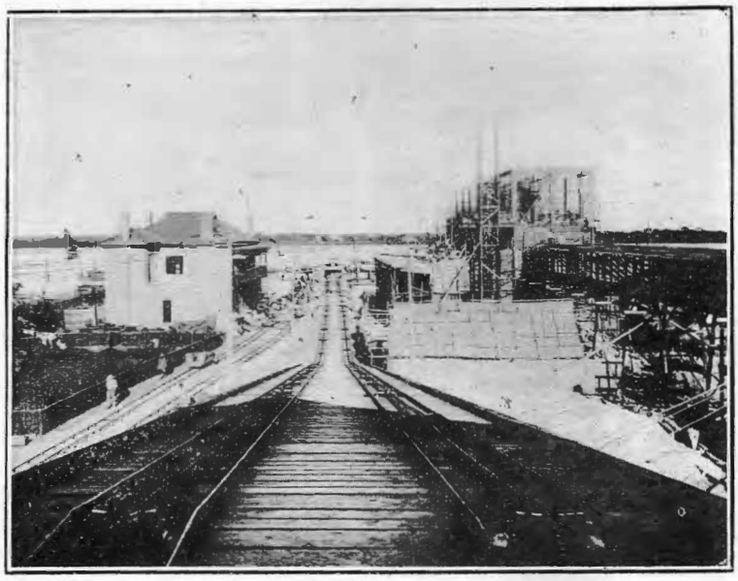
HORNE COMPANY LTD.
6-7 Takayama-cho
Kyobashi-Kn
Tokyo, Japan

CHINA.

MULLER & PHIPPS (CHINA) LTD.
5 Ice House St.
P. O. Box 25, Prince's Bldg., Hongkong, China

2 Canton Road
Shanghai, China





Two Views of the Chain Railway from Wharves to Crusher House

The Shanghai Portland Cement Works

ONE of the most hopeful signs in China is the patriotic efforts of her merchants to develop her resources and industries. During the get-rich-quick excitement of 1920, a group of Shanghai's well-known merchants evolved a scheme for the establishment of a legitimate industry that would meet the growing demands for cement. The promoter was a man of great vision who had the energy and the resources to put his dreams into practical purposes. He realized that to properly develop her industries, China must have cheap coal, and in order to keep pace with modern reinforced concrete construction China must also produce more cement. The group of merchants led by this young man, O. S. Lieu, decided in August, 1920 to erect a modern cement plant, the first step towards what is now known as the Shanghai Portland Cement Works, Ltd.

Prospecting Quarries

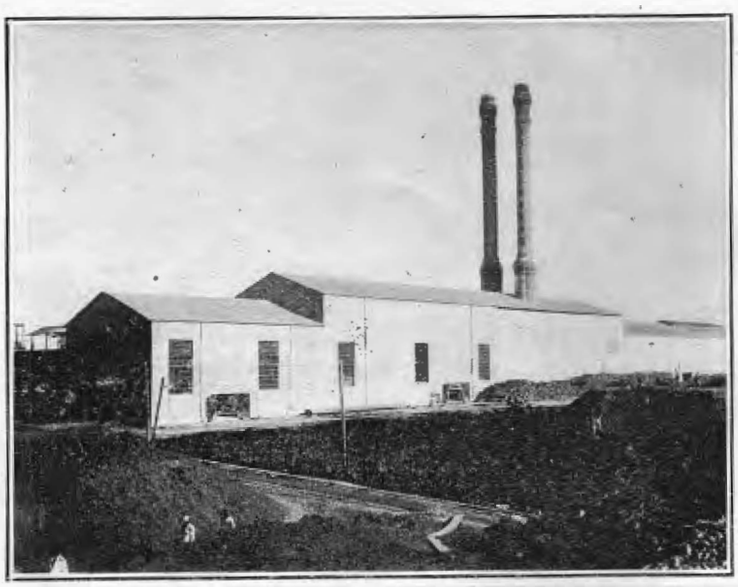
The promoters secured the services of a technical expert to advise them during the organization and act as Engineer-in-chief of the works after erection. The offer was made to Mr. H. Mollitor, formerly engineer-in-chief of the Hupeh Cement Works, whose excellent record and long residence in China, eminently qualified him for the task. Mr. Mollitor, commissioned by the promoters to locate suitable limestone quarries and clay deposits made extensive reconnaisances in the Provinces of Kiangsu, Chekiang and Anhui and recommended the stone quarry at Chen Wan Li (陳灣裡) at Wuchow, Chekiang, and the clay deposit at Zosé (淞江佘山) Sunkiang as best fitted for obtaining the raw materials from which a very high grade of cement could be produced. He, however, recommended against building the factory at or near the quarries for reasons explained elsewhere in this article.

Organization of the Company

Meanwhile the company was floated with an authorized capital of $2,000,000 silver and a board of directors was formed composed of the following well-known merchants: Mr. Chu Pao-san, Chairman, Dr. V. K. Li, Mr. Chang Chien, Mr. Chang Char, Mr. Doo Kia-quen, Mr. Hsieh Chung-sang, Mr. Y. L. Chang, Mr. K. E. Yang, Mr. K. S. Jackson Lieu, Mr. Lee Bah-ko, Mr. Zao Veng-hui, Mr. Han Yun-ken, Mr. O. S. Lieu.

Investigation in Europe and America

Representatives were sent to Europe and America to study cement manufacture and obtain machinery capable of producing the very highest grade of cement with up-to-date labor saving devices. Mr. H. Mollitor, was deputied to visit Europe, and in England, conferred with Mr. W. H. Brown, A.M.I. Mech. E., leading British authority on cement manufacture. Mr. Brown's advice and Mr. Mollitor's investigations guided the officials of the company in locating the factory site at Shanghai and in selecting the type of machinery to be erected.



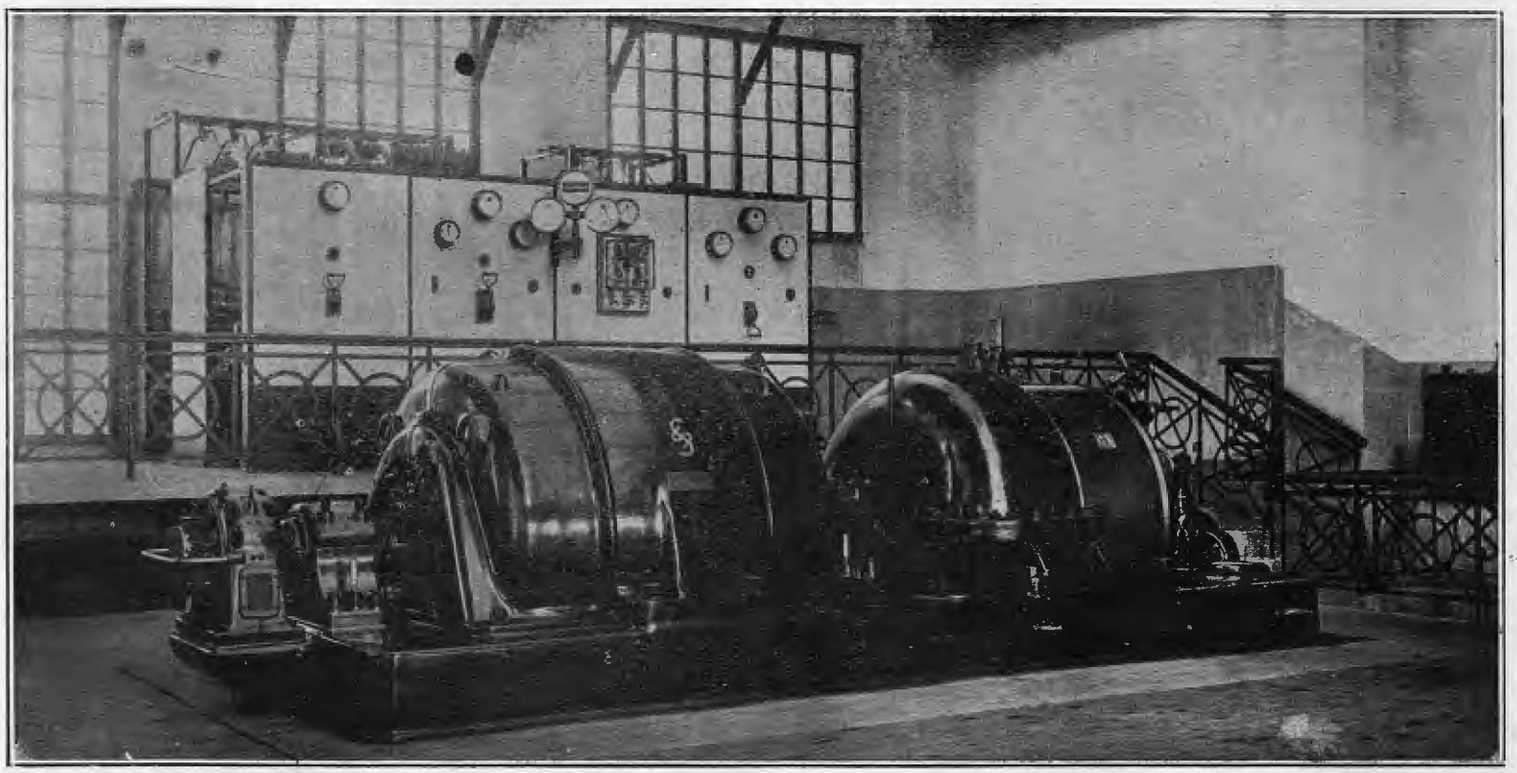
Exterior View of Plant at Lunghua

Ths Situation of the Factory

The plant of the Shanghai Portland Cement works, is located on the bank of the Whangpu River three miles above the Kiangnan Dock, and about two miles from the Lunghwa Pagoda. The two tall re-inforced concrete chimneys cast the old familiar Pagoda landmark into a shadow. The factory occupies an area of one hundred and fifty mow of land with right of reclamation to another one hundred mow of riparian land along the Whangpu. The water-frontage acquired at nominal prices measures over one thousand feet; the most valuable asset of the Company.

Selection of Site

1. *Transportation Difficulties.*—To decide upon the

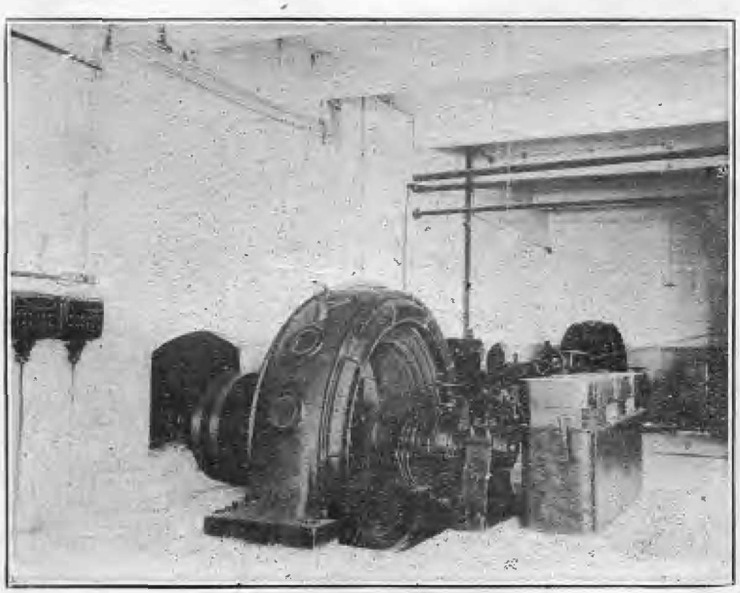


Shanghai Portland Cement Works Power Plant: 2,000 H.P., M.A.N. Turbine Coupled to 1,440 k.w., 50 cycles, 525 volts Siemens Generator

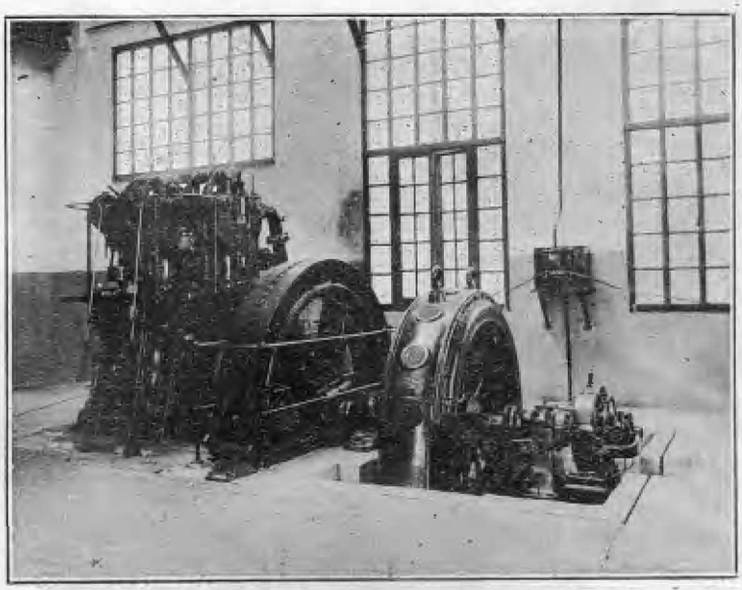
site for a cement factory, the economical transportation of raw materials (limestone, clay and coal) and the finished product must be given serious consideration. To warrant the erection of the factory at the limestone quarries a suitable grade of coal must be found in the same locality with facilities for easy communication with the market and sea-port for the export of the finished product. Such an ideal locality in China is not readily obtainable. Excellent raw materials for the manufacture of cement can be found in many places distant from the marketing centers and shipping ports rendering transportation of coal and finished product difficult and costly. In certain districts limestone and coal deposits are discovered together. But apart from the question of the quality of the coal, the two operations of cement manufacturing and coal mining mean two separate and extensive undertakings. If the advantage of the limestone quarry is alone considered, the coal must be transported to the factory by means of junks, entailing much loss, delay and uncertainty of supply. These difficulties would be repeated and intensified when the finished product is transported to the market, as cement must be transported in covered junks. Even then deterioration and damage will happen through careless handling and climatic changes. The Shanghai Portland Cement Works obtains its regular supply of limestone and clay from its own quarries in Wuchow and Sungkiang, conveyed by native junks at very reasonable charges and rain or shine the raw materials are daily received in quantities to suit the requirements of production. The works are not handicapped if a boatload of stone or clay turns turtle on the way or the contents are wet with rain nor with a suspension of boat traffic for a spell of one or two months. An immense stock of clay and stone sufficient for ten months consumption is always kept on hand at the works. Coal is landed at the factory wharves direct from Chinwangtao by steamer. These wharves can accommodate steamers of over three thousand tons. Thus the cost of lighterage from coal yard, theft and watering by boatmen on the way to the interior are saved.

2. *Inconsistency of Limestone Quarries.*—Many cement factories in Europe and America had been forced to close down because the quality of the limestone has deteriorated as excavations became deeper. It was then too late to consider the transport of raw materials from other quarries, unless the factory was transplanted to another locality. To provide for this contingency Mr. Mollitor advised against erecting the plant at or near the quarries.

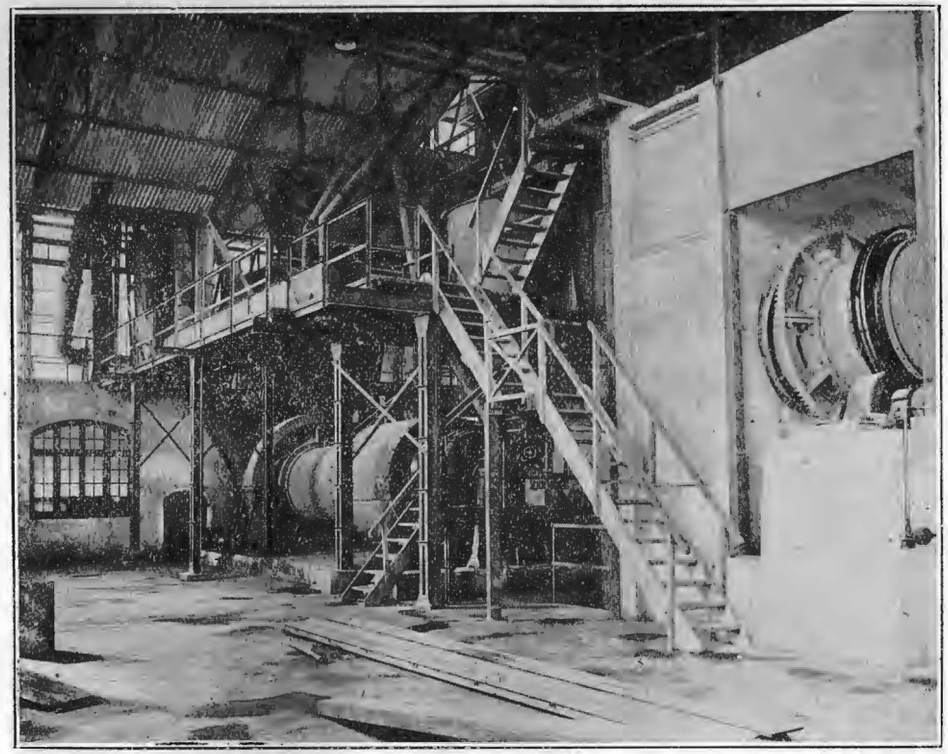
3. *Skilled labour and engineering materials.*—Shanghai is the



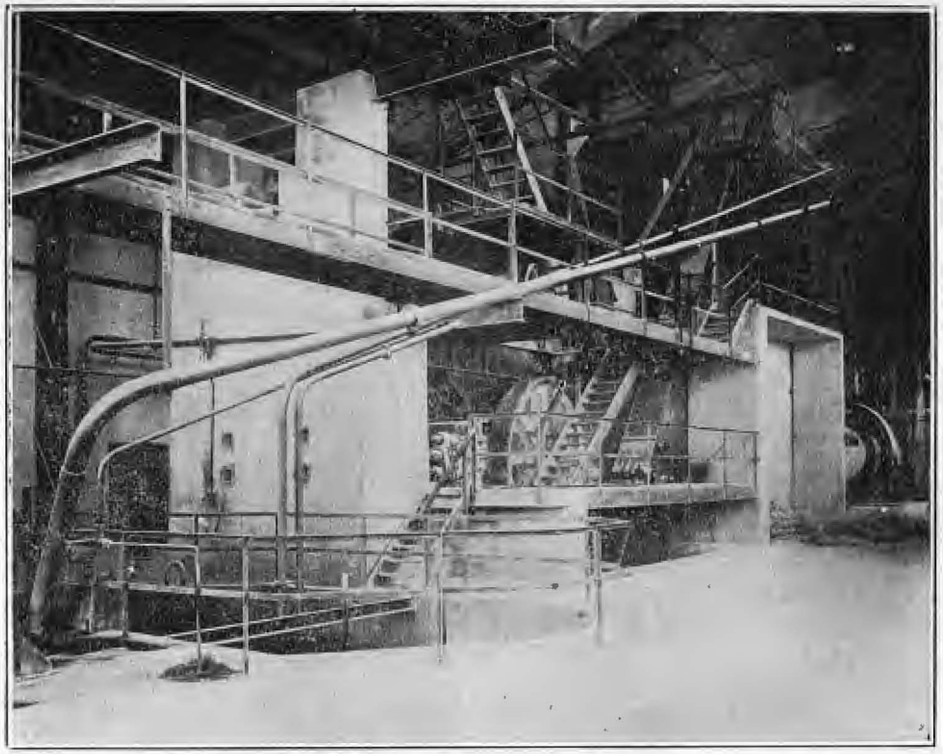
Motor in Crusher House



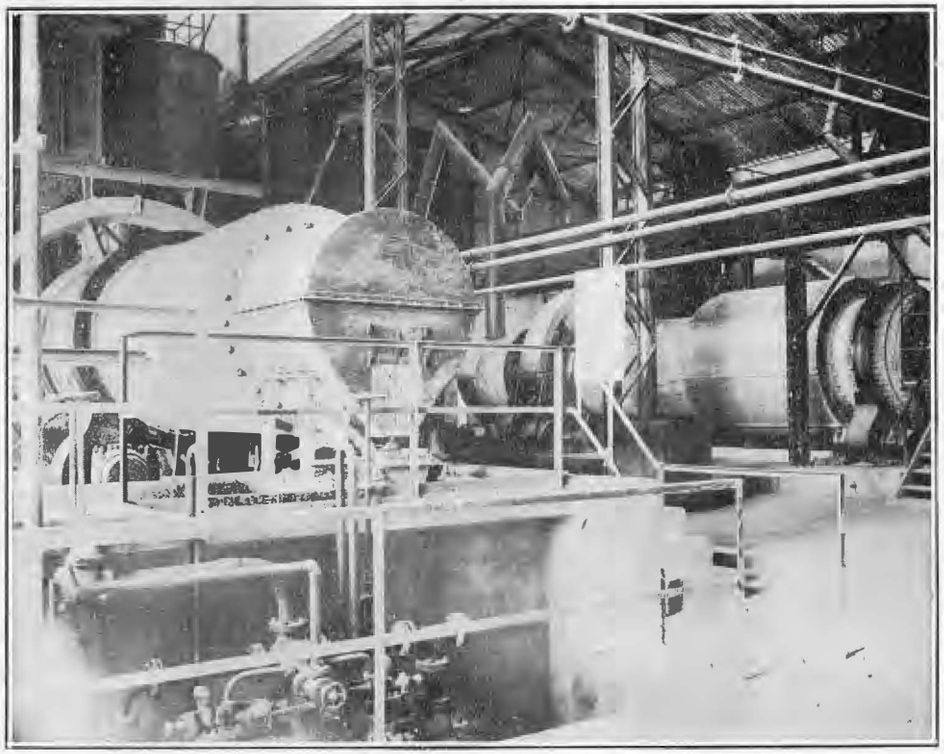
250 H.P. Diesel Engine and Generator



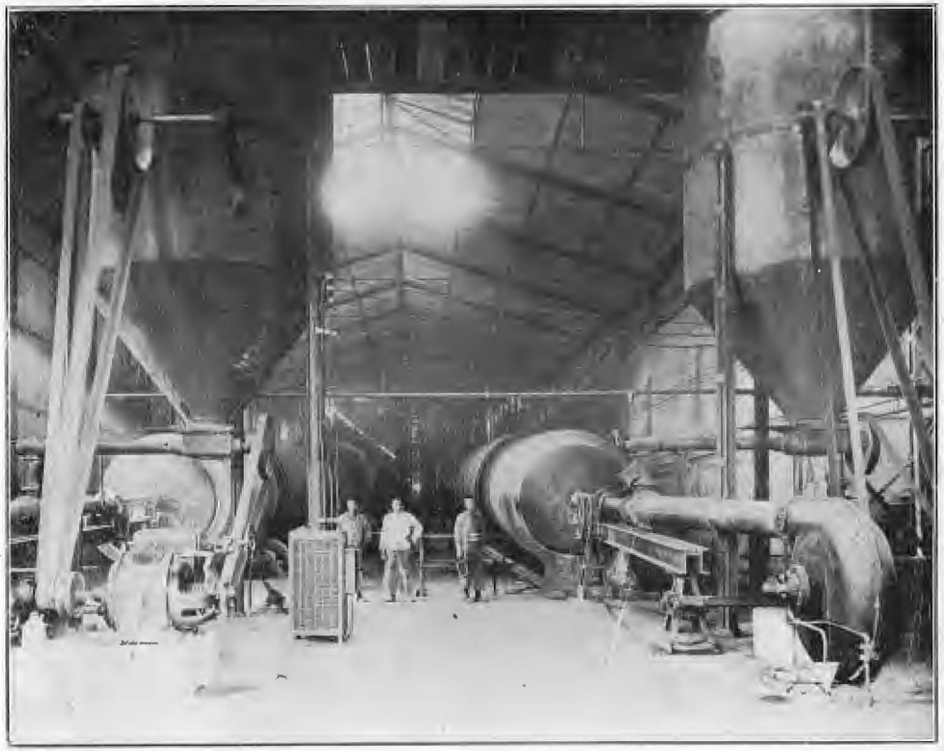
Coal Pulverizing Mill



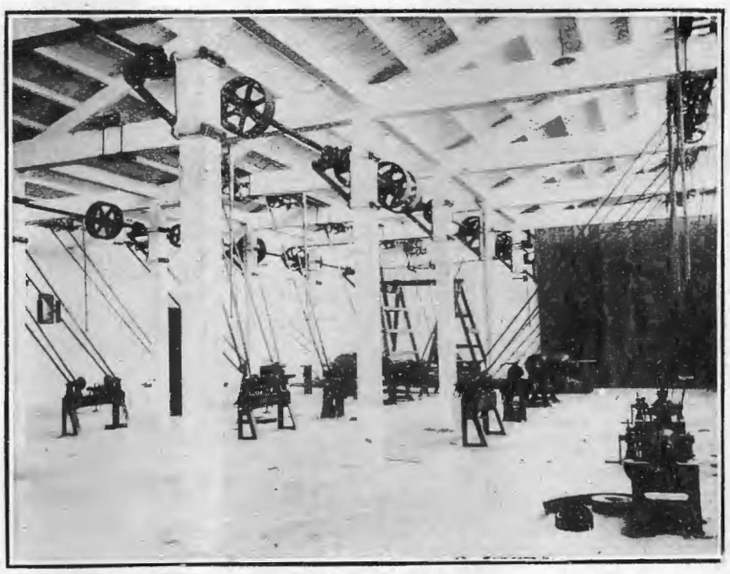
Crusher Above—Rollers Below



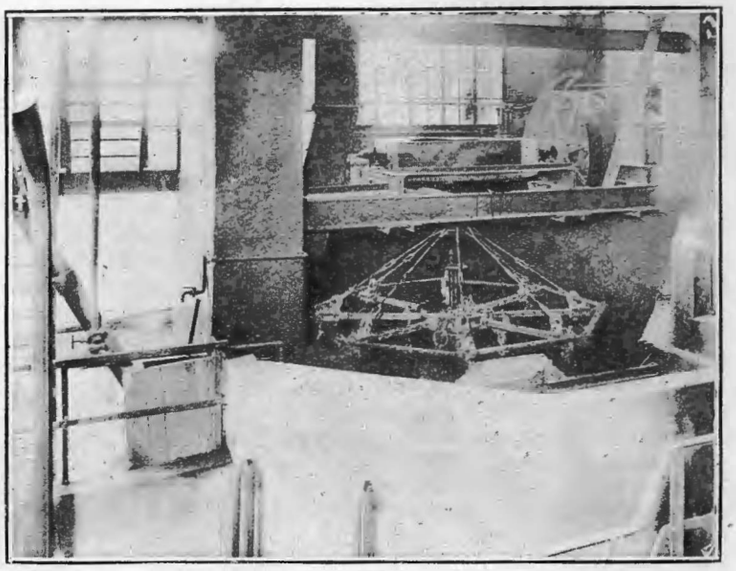
Raw Mill—Cement Mill



Rotary Kilns



Barrel Shop



Clay Wash Mill

one place in China where skilled labour can be had on short notice. In case of machinery breakdown, repairs can be completed far more expeditiously than elsewhere in China. Nor is it necessary to keep in stock a large supply of engineering materials thus saving a large amount of capital being tied up.

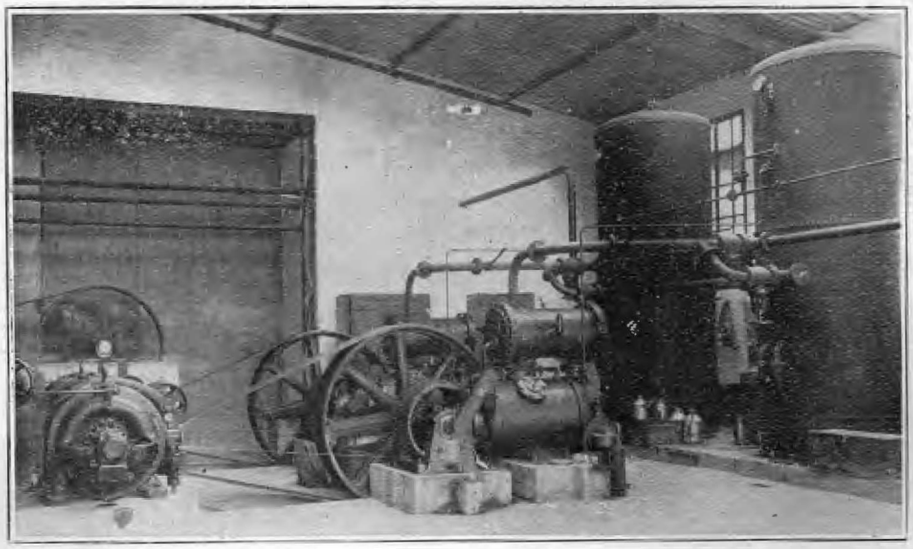
The Purchase of Machinery in Europe

In the choice of machinery for the new enterprise the directors accepted the plans submitted by Messrs. G. Polysius of Dessau, Germany, who manufacture cement machinery exclusively. This same firm equipped the Holderbank Factory of Switzerland in 1913, acknowledged by experts as one of the best in the world. In design and construction the machinery of the Shanghai Portland Cement Works is claimed to be even superior to the Holderbank installation.

Description of the Cement Plant

The plant is one homogeneous unit. The process of manufacture commences with the discharge of raw materials at the wharf fitted with electrically operated cranes for lifting limestone and clay from the junks. The stone and clay are hauled in tipping wagons up a chain railway, also electrically operated, into the crusher house. The cars are dumped, the stone falling into a mechanically working feeding grate which carries the stone into the crusher. From there the crushed stones pass into a roller mill from where the sized stones are conveyed by slanting elevators to the large bin situated above the raw material grinding mill. The clay carried up by the chain railway is dumped into the wash mill. The washed clay flows into what is called "the Pressors" which convey or press the clay by means of compressed air which is manufactured in another department, into another bin also situated above the raw material grinding mill. Both the sized stones and the washed clay are now fed by special feeding devices into the raw material grinding mill. The raw material grinding mill is a compound mill, called "Solo Mill," having two compartments to contain steel balls and flint stones respectively by which clay and stone are ground into fine slurry. The slurry flows into the pressors and is forced by compressed air into three separate tanks capable of holding four hundred tons each of the mixture. The functions of these tanks are for storage and for regulating the mixture so that a constant uniformity of the materials for production is obtained. The work of regulating or mixing the contents of the tanks is done by means of compressed air. This branch of work is in charge of the laboratory. The slurry having been consistently mixed it flows into another set of pressors and transmitted to the bins situated above the rotary kilns. By a special feeder the slurry is fed into the kilns. The kilns of the Shanghai Portland Cement Works are of a special type and design, having an enlarged sintering zone and the whole length of the Kiln is erected on floor level. This feature is especially interesting inasmuch as the Kiln of all other makes are erected on very high foundations in order to allow the cooling drums to be installed underneath them. Whereas the cooling drums of the Kilns of this Factory are attached to the ends which is the latest improvement. The slurry fed into these kilns is burned with pulverized coal, producing a heat of 1,500 degrees Celsius by which process clinker is formed. The clinker when cooled down in the attached cooling drums at the end of the kilns is conveyed to the clinker hall by means of shaking conveyors and elevators, going through at the same time an automatic weighing scale which registers the amount of production of each kiln. The Clinker Hall of this Factory has a storage capacity of 15,000 tons.

The coal required for the kilns for the production of clinker is pulverized and the process of pulverization is a separate process. The coal is carried into a grate receptacle and fed into an elevator which conveys it into an automatic weighing machine and is registered. From there it is sent into a bin above the drying drum which is heated with a special fire. The dried coal is sent to another bin from which the grinding mill is fed. This mill grinds the coal into very fine powder. The coal powder is conveyed, by elevators and worms, into storage bins above the kilns. This is fed into the kilns by high pressure fans which blow it into the sintering zone where it is exploded by the surrounding heat in the kiln. The



Air Compressor Room

quantity of coal powder to be fed into the kiln is controlled and registered by special mechanical devices

The clinker stored in the clinker hall is sent to the cement mill by shaking conveyors installed in the tunnel under the clinker hall. The conveyors receive the clinker from the clinker hall through special trap devices and it is carried up by an elevator and sent to a storage bin above the cement mill. Prior to the clinker entering the bin gypsum is added to it for the purpose of regulating the setting of the ground cement. For this purpose a gypsum crushing and distributing plant is installed between the clinker hall and the cement mill. The quantity of gypsum to be added varies according to the temper of the clinker and it is therefore regulated by the Laboratory When the clinker is sent to the cement mill by a special feeder the setting time of the cement to be produced is already determined. The cement mill is exactly similar in construction to the raw material grinding mill, namely a compound mill containing steel balls and flint stone with which the clinker is ground into fine cement. This is one of the most important sections of the factory, for the fineness of the cement depends upon the serviceability of the cement mill. Any cement mill will grind and grind the clinker to high fineness, but the problem is, will a cement mill grind to required fineness and required quantity per day's output at the same time ? The cement mill loses its function when it produces quality at the expense of quantity or vice versa. This is the point that some of the new cement factories have overlooked when ordering their machinery and this problem is facing them seriously to-day. When a cement mill is not efficient either quality or quantity must be sacrificed. The choice is of course whether the buyers or the manufacturers shall be the ultimate sufferers.

When the cement is ground it is sent to a special cement store or cement silos. It is conveyed from the mill by an elevator to the worm conveyers of about 82 metres in length. These conveyors feed the cement into an automatic weighing machine and from thence the cement is sent to the silos. The capacity of the silos of this factory is 25,000 barrels. Below each silo an automatic packing machine is installed. There are two barrel packing and three bag packing machines being provided. These machines are capable of filling 2,000 barrels and 3,000 bags in a day.

To prevent waste, the cement and coal mills are provided with dust collectors of special device called Beth filters. The dust thus collected is returned to the respective mills. For arresting the fine materials being blown out of the chimneys from the kilns, the smoke chambers situated between the heads of the kilns and the chimneys are provided with special arresting devices whereby all such dust is collected and returned to the slurry. One prominent cement engineer who visited the factory remarked that the works as well as the area around them were surprisingly free from dust !

The Power Plant

The whole factory uses electricity as its motive power. The power plant consists of one 2,000 h.p. M.A.N. turbine coupled with one 1,440 k.w., 50 cycles and 525 volts Siemens generator. The boiler room has an installation of five water tube boilers (Machinenfabrik Esslingen), each having a heating surface of 204 square metres, with super-heaters, mechanical grate stokers, suction draught plant, economizers, water cleaners and pumps. Coal is fed by electrically operated lifts. The boiler house being elevated the ashes are discharged through hoppers into the room below from where they are taken away on cars. There is also a Diesel generator of 80 k.w. to provide current for light and power during holidays. The factory has its own water installation. All the units of the factory are driven separately by electric motors.

The Barrel Shop

The factory has its own barrel shop capable of turning out 1,500 barrels per day. A complete set of machinery for the purpose has been installed. For consumers who prefer iron drums a set of drum making machinery and a welding plant are ready to meet requirements.

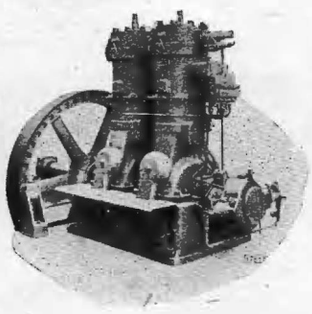
The Laboratory

A complete and up-to-date laboratory with highly trained European and Chinese experts controls the quality of the cement produced in the factory. The laboratory is equipped with apparatus for tensile, compression and chemical tests. Every ingredient that has to go to the factory for the manufacture of cement is first passed through the laboratory and it is accepted or rejected according to the tests. Very careful and painstaking tests are carried out hourly and records made. No cement is sent out to the market that escapes the watchful eye of the laboratory staff, so that the consumers can safely rely upon the quality of every bag or barrel of cement produced in the works the excellence of which the company claim.

General

The building construction of the factory is of modern type. Owing to the nature of the soil the foundations both for the factory itself and the cement silos are of cement block type. A new and interesting feature of the construction was that all machinery was put up before the masonry work. The office buildings, residences for the manager, the engineer-in-chief and the staff are spacious modern buildings. The godown now in process of construction will have a storage capacity of 25,000 barrels. The two jetties for discharging raw materials and coal and also for loading cement are capable of taking care of half a million tons annually. These jetties can berth steamers of over 3,000 tons. The construction of the factory commenced in September, 1922 and was completed on July 18, 1923 on which date the works started to manufacture cement. It took the record time of ten months to complete the whole construction, a fact in which the company take just pride.

The whole factory is built with provisions for extension from 1,400 barrels per day which is the present capacity of output to 2,800 barrels per day. Investigation showed that only seventy-eight workmen are employed in the factory and when one has known other factories of similar nature which employ twelve times the number of labourers, one at once begins to appreciate the modernness of this factory. And this is the factory situated in Shanghai which is sending out daily hundreds of barrels of cement bearing the label of an elephant whose quality the officials claim is equal, if not actually excels, the Holderbank output.

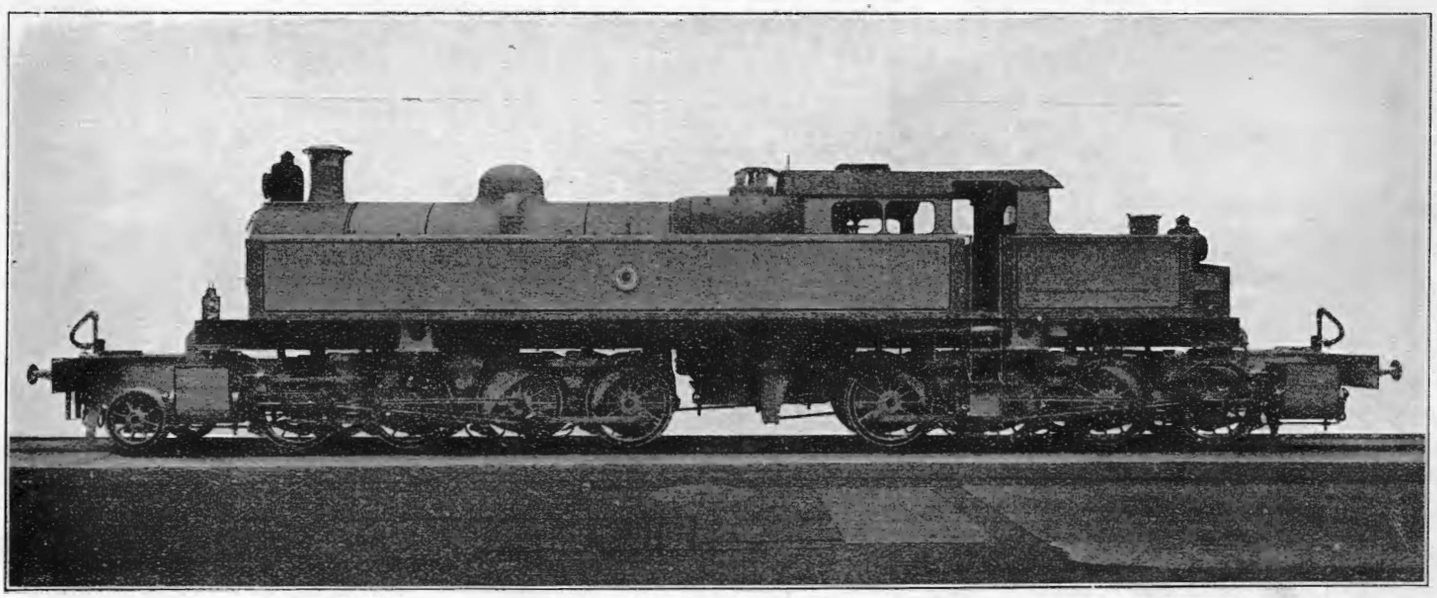
SULZER
BROTHERS
SHANGHAI ENGINEERING OFFICE
No. 4 AVE. EDWARD VII
蘇爾壽工程事務所
上海愛多亞路四號

Airless Injection
Two Cycle Sulzer
Diesel Engines
目錄及關於工業上之問答等請直接本公司
Uniflow Steam Engines, Upright Watertube Boilers, High and Lowlift Centrifugal Pumps, Fans and Ventilators for all purposes, Fire Engines, STATIONARY DIESEL ENGINES, Direct Reversible Diesel Marine Engines, Ice and Refrigerating Plants, Electro-Boilers, Maag Gears and Maag Gear Planing Machines.
WINTERTHUR. SWITZERLAND.

ASSOCIATED BRITISH LOCOMOTIVE MANUFACTURERS FOR CHINA

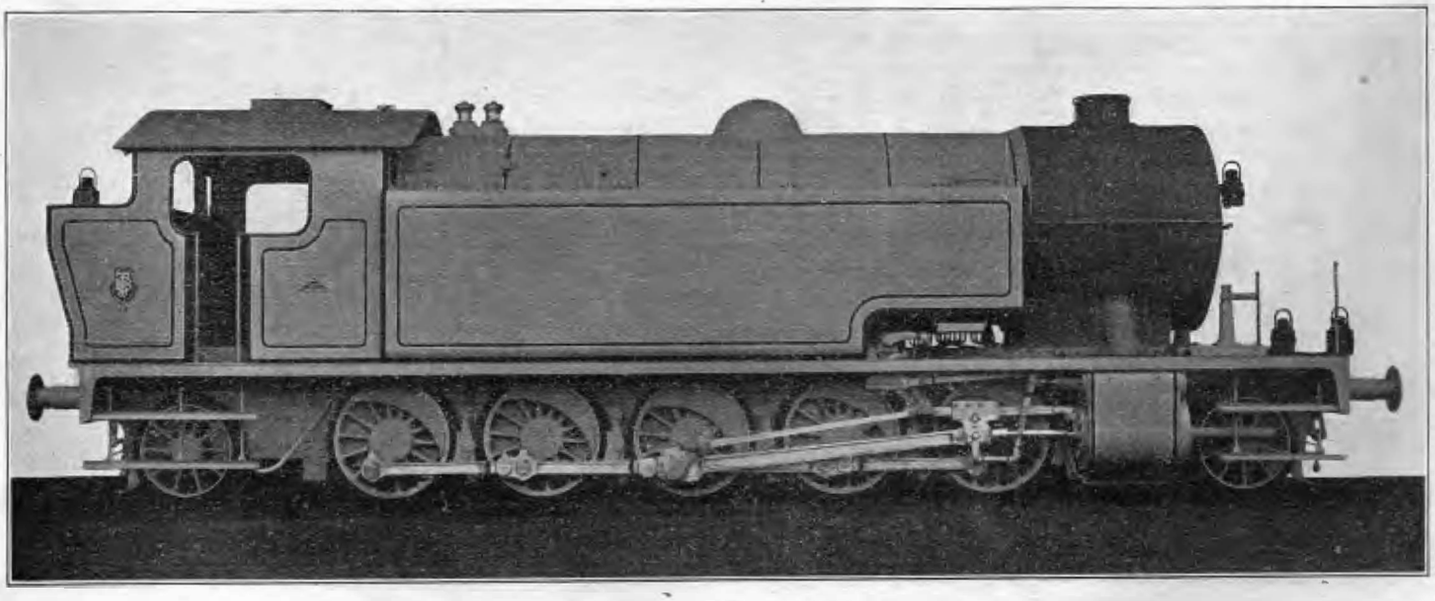
Head Office:
7 HOBART PLACE
GROSVENOR GARDENS
LONDON

TEL. ADDRESS: REBRITMAN, PEKING

Agents in China:
REPRESENTATION FOR
BRITISH MANUFACTURERS LTD.
46 WAI CHIAO PU CHIEH
PEKING



ANDREW BARCLAY SONS & CO., LTD.
THE AVONSIDE ENGINE CO., LTD.
W. G. BAGNALL LTD.
BEYER PEACOCK & CO., LTD.
HAWTHORN LESLIE & CO., LTD.
HUDSWELL CLARKE & CO., LTD.
THE HUNSLET ENGINE CO., LTD.
KITSON & CO., LTD.
NASMYTH WILSON & CO., LTD.
THE NORTH BRITISH LOCOMOTIVE CO., LTD.
ROBERT STEPHENSON & CO., LTD.
THE VULCAN FOUNDRY, LTD.
THE YORKSHIRE ENGINE CO., LTD.

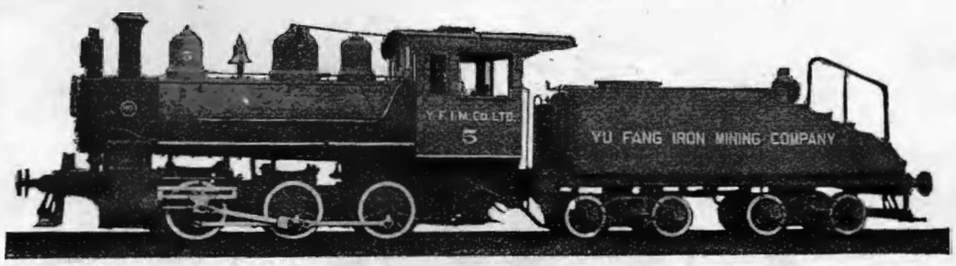


AS BUILT AT ONE OF THE A.B.L.M.C. WORKS

BALDWIN

Six-Wheeled Switchers

Used in the Development of the Iron Industry of China



Built for Yu Fang Iron Mining Co., Ltd., China

Gauge, 3′6″
Cylinders, 14″ × 16″
Working pressure, 180-lb.
Driving wheels, diameter, 36″
Weight, engine, 55,300-lb.
Weight, engine and tender, 110,000-lb.

THE Six-wheeled Switching locomotive illustrated was recently built by these Works for the Yu Fang Iron Mining Co., Ltd., for use in hauling large quantities of ore from the mines at Fanchang, Anhwei Province, China, to the Yangtsze River.

Among the features embodied in this type of locomotive are sturdiness in construction, adequate power for the service intended, and accessibility to all parts to facilitate repairs.

Baldwin Industrial Railway locomotives are giving good service in many countries.

The Baldwin Locomotive Works

PHILADELPHIA, U.S.A. *Cable Address* : **" Baldwin, Philadelphia "**

OFFICES:

J. M. Wright, Bandoeng, Java, D.E.I. **J. W. Kelker, Harbin, Manchuria**

AGENTS:

Andersen, Meyer & Co., Ltd., Peking and Shanghai **Sale & Frazar, Ltd., Tokyo and New York**

RESIDENT TECHNICAL REPRESENTATIVES:

R. E. McFalls, Peking, China **E. P. Williams, Jr., Shanghai, China**

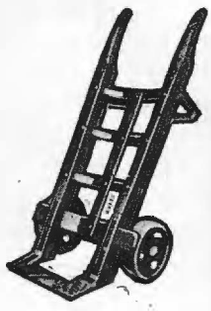
J. F. Greig, Tokyo, Japan

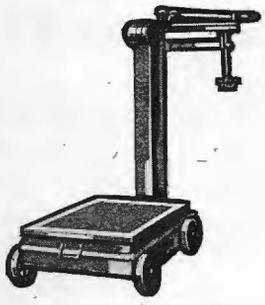
1131

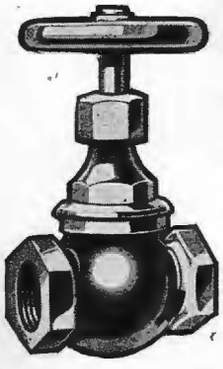
LOCOMOTIVES

FAIRBANKS

SCALES, VALVES, TRUCKS AND BARROWS



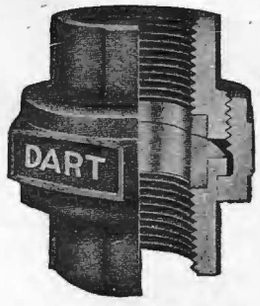




FAIRBANKS Scales not only have a world-wide reputation for dependability, but for their unusually long life and continued accuracy.

FAIRBANKS Globe, Angle and Check Valves in Brass and Iron, also Asbestos Packed Cocks are of a known quality made and suitable for all pressure requirements. Dart Union couplings of malleable iron possess two bronze seats preventing corrosion and leaks.

FAIRBANKS Trucks and Wheelbarrows are manufactured in many styles and for practically every purpose, and are made to meet all requirements.



Catalogs sent on request.

THE FAIRBANKS COMPANY

416 Broome St., New York, U.S.A.

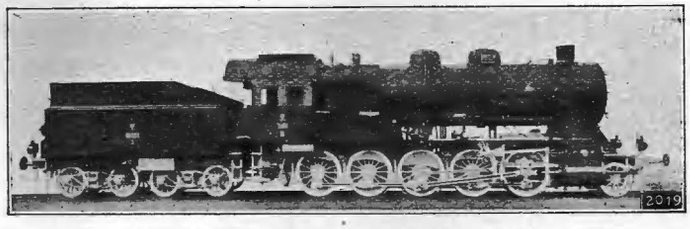
London Office: **The FAIRBANKS Company (Europe), Ltd., 15 Mallow Street, London, E.C.1.**

BERLINER MASCHINENBAU-A.-G.

vormals

L. Schwartzkopff

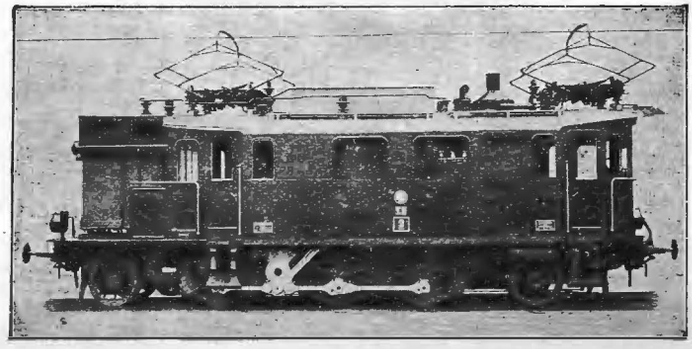
BERLIN N. 4, CHAUSSEESTRASSE 23

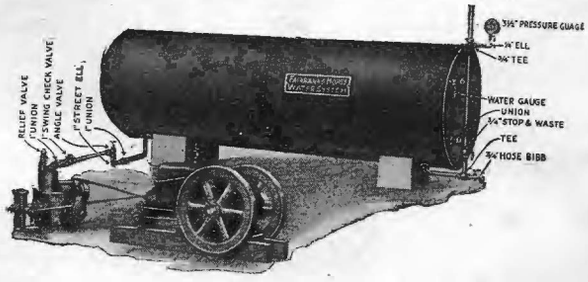


LOCOMOTIVES

OF EVERY SIZE AND FOR EVERY GAUGE

Superheated Steam Locomotives, Electric Locomotives, Complete Installations for Haulage by Compressed Air Locomotives.





A Reliable Home Water Plant

The Fairbanks-Morse Home Water Plant is simple, easy to install and requires little attention. It is absolutely safe and dependable.

With this plant you can keep a supply of running water at a cost of about two cents a day. It is designed for use with shallow wells, cisterns, springs or streams where the maximum vertical lift from low water level is not over 22 feet.

Write for literature covering these two Fairbanks-Morse plants or visit your dealer for detailed explanation.

Fairbanks, Morse & Co.
INCORPORATED MANUFACTURERS

Export Dept., 30 Church St., New York, U.S.A.

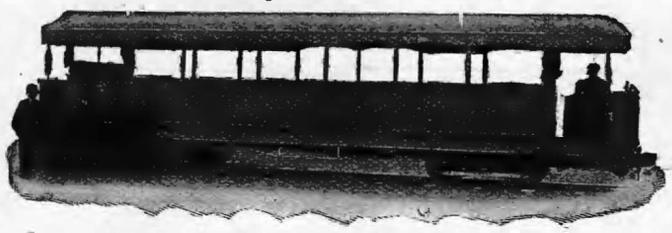
Far Eastern Agents:

Salc & Frasar, Ltd., Tokio
Borneo Co., Ltd., Singapore
Pacific Commercial Co., Manila
M. S. Vernal & Co., Calcutta
International Engineering Co., Bangkok
Technisch Bureau Soenda, Bandoeng

MOTOR RAIL & TRAM CAR CO., LTD.

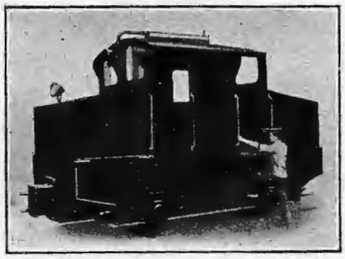
LIGHT RAILWAY ENGINEERS

Manufacturers of Internal Combustion Engined Locomotives, Rail-Inspection and Tramcars



70 Seat Double Bogie Rail Car

Locomotives and Rail Cars Designed and Built to Meet all Requirements



Estimates and Full Particulars on Application

Enquiries Solicited

16 Ton Petrol Shunting Locomotive

These vehicles are thoroughly reliable, economical, inexpensive to maintain, easily handled and entail no stand-by losses

WORKS & OFFICES:
Telegrams & Cables: Motral-Bedford
Codes: A.B.C. Engineering 5th Ed & Bentleys

SIMPLEX WORKS:
Bedford, England

The JANNEY-PENN Coupler

THE latest development of the Janney type of M. C. B. Coupling originally introduced and promoted by this company. This coupler has all the simplicity of the early type of the Janney coupler, and also has the up-to-date features of a "Lock-to-the-Lock," "Lock-Set," and a "Knuckle-Opener," and complies fully with all the requirements and recommendations of the M. C. B. Association of the U. S. A.

This coupler has the desirable feature of easy accessibility of parts, thus facilitating the making of repairs.

Furnished with various designs of rear end to suit different types of Draft Rigging.

Manufactured exclusively by

THE McCONWAY & TORLEY CO.

Pittsburgh, Pa., U. S. A.

Cable Address—Torley, Pittsburgh

China Agents: The Fearon, Daniel Co., Tientsin, Peking, Hankow and Shanghai, China

Ruston Draglines

We build a full range of Dragline Excavators for Drainage and Irrigation work of all descriptions. The buckets vary from ½ to 10 cubic yards capacity with jib lengths from 30 to 160 feet.

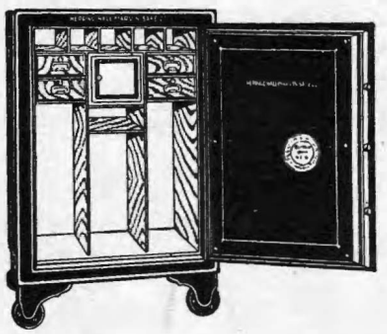
Canals from 3 feet to 300 feet wide are being excavated by them.

Catalogues from:

Ruston & Hornsby, Ltd., Lincoln, Eng.

or

Martin & Co., Calcutta
Arnhold & Co., Ltd., Shanghai
United Engineers, Ltd., Singapore



Unfailing Protection For Your Most Valued Possessions

HERRING-HALL-MARVIN

Safes and Bank Vaults

All sizes from the smallest Home Safe to the largest Bank Vaults, Key-Lock or Combination.

MUSTARD & COMPANY

Sole Agents for China, Hongkong and Macao.

Shanghai, Tientsin, Hankow, Hongkong, Canton, Harbin.

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

遠東時報

上海仁記路第五號

GOING BACK TO PORTSMOUTH
P. CHIERI 1924

A CONSPIRACY OF SILENCE

THE STATUS OF THE CHINESE RAILWAY

THE BASIS OF AN HONORABLE SOLUTION TO MANCHURIAN PROBLEMS

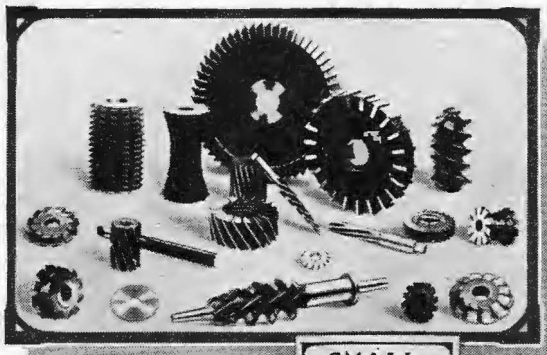
MILLIONS FOR ADVERTISING TEA
MONGOLIA, A SORRY PICTURE
SHANGHAI SEWERAGE
MANCHURIAN BEET SUGAR
HARBIN WATERWORKS PROJECT
TIENTSIN-PUKOW ELECTRIC PLANT
PEKING TRAMWAYS

Vol. XX June, 1924 No. 6

SHANGHAI, PEKING, TOKYO AND MANILA

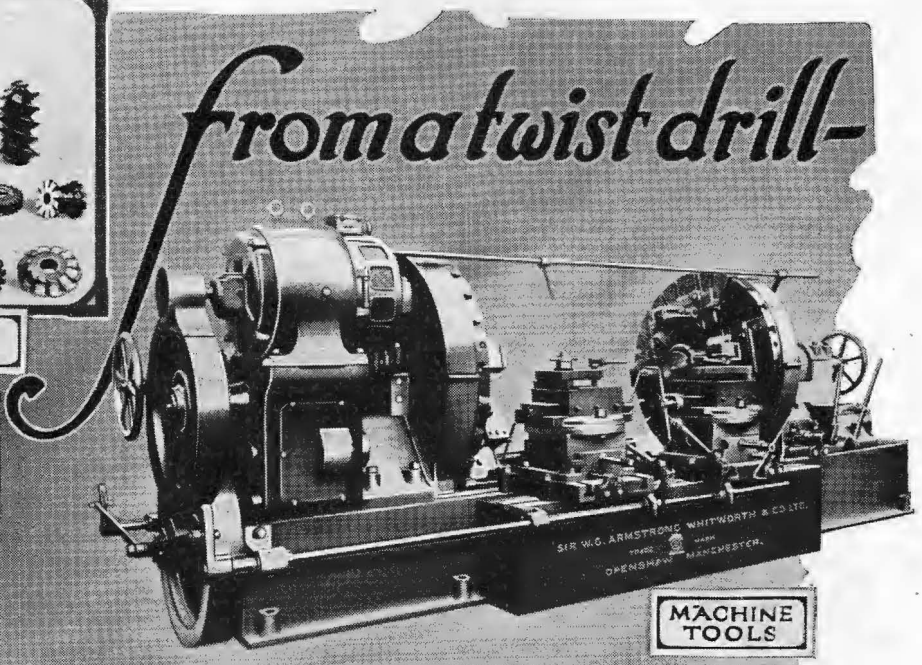
ARMSTRONG·WHITWORTH

SHIPS
MARINE ENGINES
LOCOMOTIVES
MACHINE TOOLS
FORGINGS CASTINGS
NON FERROUS PRODUCTS
DROP STAMPINGS
HIGH SPEED STEELS
SMALL TOOLS GAUGES
PNEUMATIC TOOLS
ELECTRIC LIGHTING SETS
ROAD MAKING MACHINERY
HYDRAULIC MACHINERY
HYDRO ELECTRIC PLANT
CIVIL ENGINEERING
GENERAL ENGINEERING

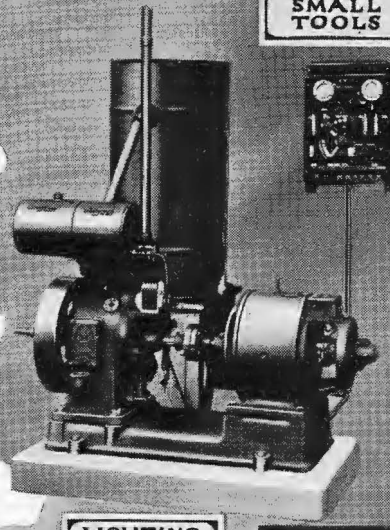


SMALL TOOLS

from a twist drill–



MACHINE TOOLS



LIGHTING PLANTS

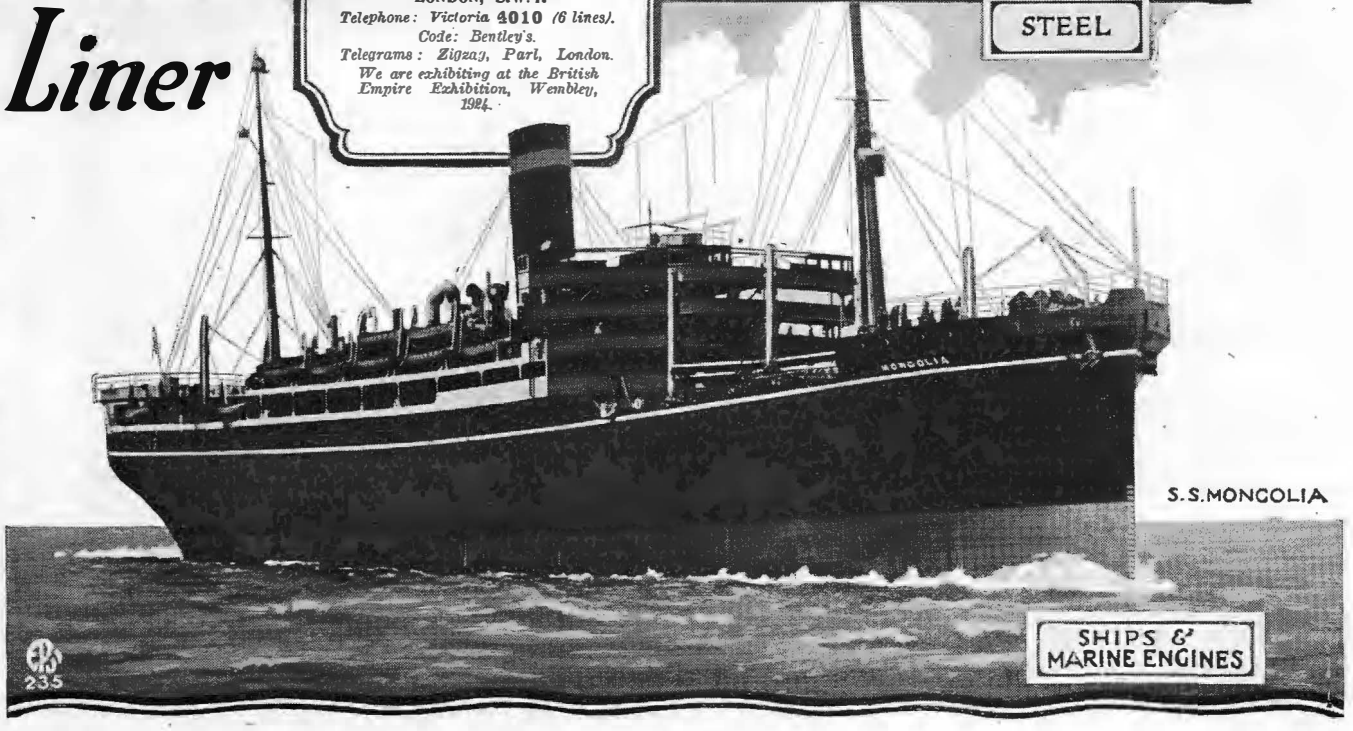
STEEL

Brochure 249 gives a comprehensive list of our products and those of our Associated Companies.
It is a valuable buyers' guide, and we invite your enquiries for it.

Sir W. G. ARMSTRONG, WHITWORTH & CO., Ltd.,
8 Great George Street, Westminster, LONDON, S.W.1.

Telephone: Victoria **4010** *(6 lines).*
Code: Bentley's.
Telegrams: Zigzag, Parl, London.
We are exhibiting at the British Empire Exhibition, Wembley, 1924.

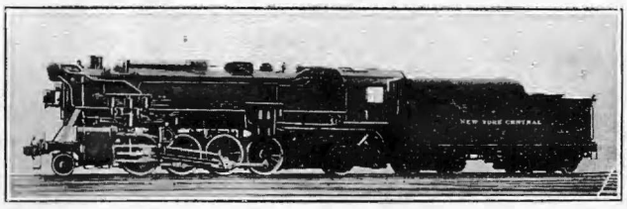
–to a Liner



S.S. MONGOLIA

SHIPS & MARINE ENGINES

235



Modern high speed Mikado type locomotive, equipped with Elesco Type E Superheater and Elesco Feed Water Heaters. The throttle is placed in steam piping between superheater and cylinder thus providing superheated steam instantaneously to the cylinders and supplying the auxiliaries with superheated steam.

THE SUPERHEATER COMPANY

17 East 42nd Street, New York City, N.Y., U.S.A.
Peoples' Gas Building, Chicago, Ill., U.S.A.

Eastern Representative:

George E. Spengler, 1 Tin Yin Hutung, Peking, N. China

SUPERHEATERS (ELESCO)

Designing Engineers and Manufacturers of Elesco Steam Superheaters for Locomotive, Marine and Stationary Services, Elesco Locomotive Feed Water Heaters, Boiler Feed Pumps and Pipe Coils.

CONDENSITE CELORON

FOR

RADIO PANELS

Radio instruments should be mounted on panels or bases which insulate as nearly perfect as possible.

Celoron is an ideal material for radio panels. It is strong, hard, and waterproof with a high degree of surface and volume resistivity, high dielectric strength and low dielectric losses. It has been approved by the United States Signal Corps.

Celoron may be easily sawed, drilled, turned, tapped or milled and will admit of sharp, clean cut engraving. The finished Celoron is smooth and hard. A lustrous black in color, it adds much to the attractive appearance of any radio set. Mount your instruments on Celoron.

Write for samples and prices.

Diamond State Fibre Company

Bridgeport, Pa. (near Philadelphia), U.S.A.
Cable Address: "DYMNFYBR." Norristown

Representative:

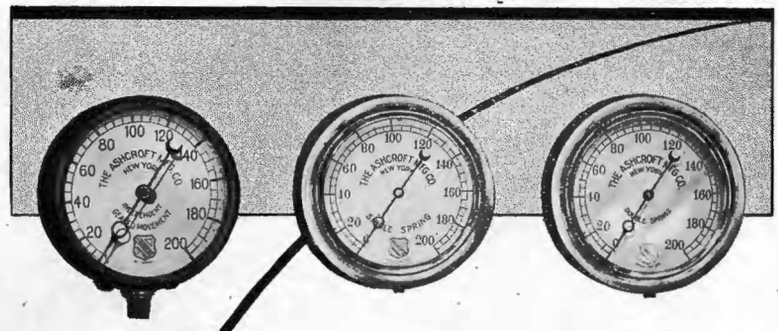
AMERICAN TRADING COMPANY

China; Shanghai, Tientsin, Peking.
Japan: Tokyo, Kobe

Diamond State Fibre Company

Bridgeport, Pa. (Near Philadelphia) U.S.A.
Cablegrams "DYMNFYBR", Norristown.

Where there's Pressure



ASHCROFT Steel Case Single Spring Gauge (Type FP Form SH)

ASHCROFT Iron Case Sinele Spring Gauge (Type SP Form IR)

ASHCROFT Iron Case Double Spring Gauge (Type DP Form IR)

RUN BY GAUGE AND NOT BY GUESSWORK

No machine can do its best work unless run at the right pressure. Pressure gauges, therefore, must unfailingly be accurate.

But *all* gauges *are not* accurate and one might better go by guesswork than to trust their readings.

That is why the Ashcroft Gauges are universally used where an absolutely accurate reading is required to protect both the machine and the quality of its work.

For seventy years they have been made by the oldest, largest and best equipped gauge factory in the United States. Every form of movement is supplied to take care of every pressure reading requirement from zero to 1,000-lbs. and over.

Our agents will be glad to quote you prices and to consult with you concerning the types best suited to your work. Consult them also about Consolidated Safety Valves and Metropolitan Injectors—for many years an engineering standard throughout the world.

ASHCROFT GAUGES

MANNING MAXWELL & MOORE INC. M&M TRADE MARK

Manning, Maxwell & Moore, Inc.

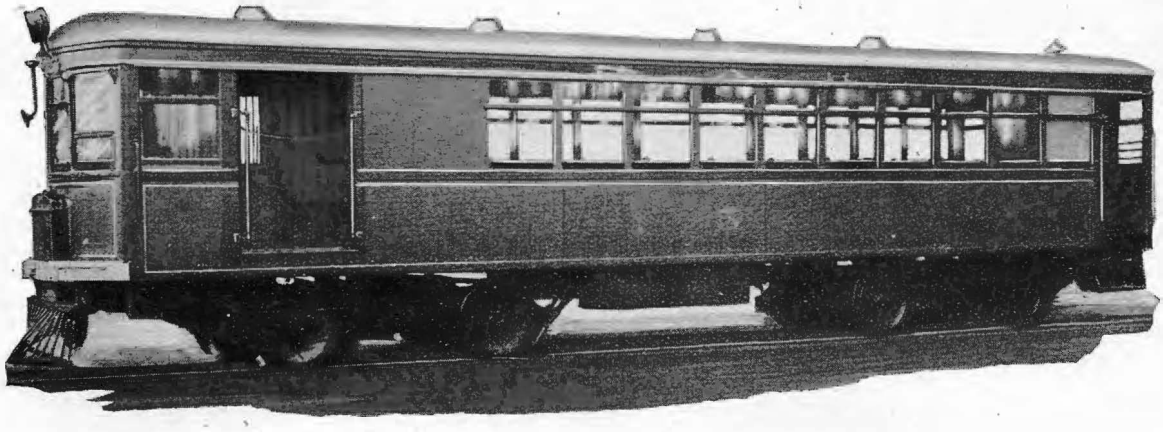
Pershing Square Building
100 East 42nd Street, New York, N.Y.

Agent for China:

Walworth International Company, 29 Szechuan Road, Shanghai, China

Agent for Japan: Horne Co., Ltd., 6 Takiyama cho, Kyobashi Ku, Tokio

Exceptionally Low Operating Cost



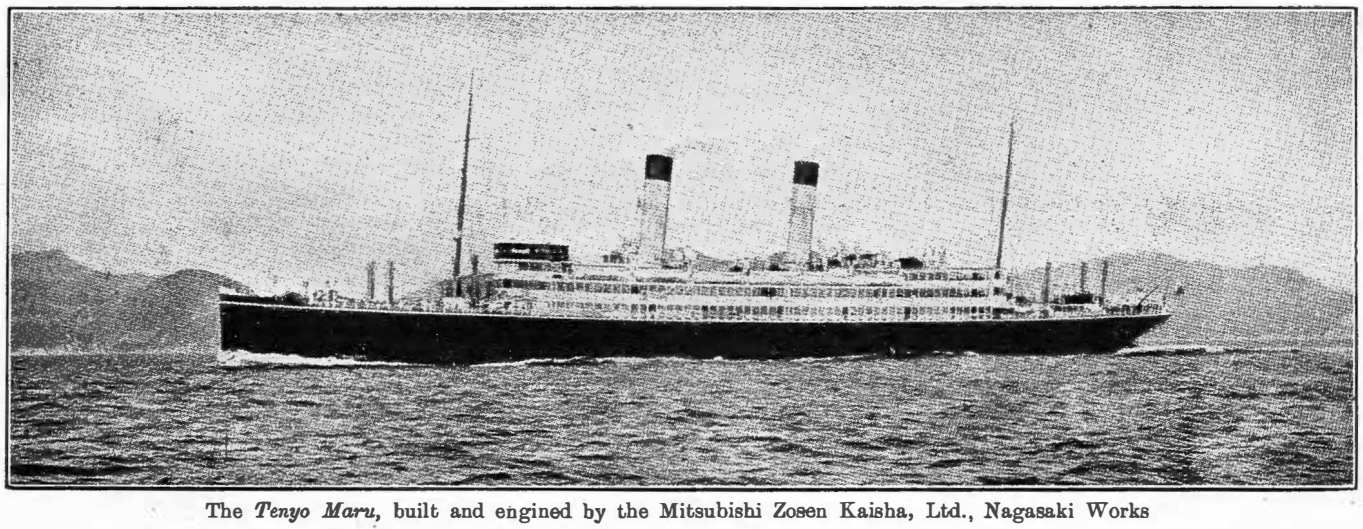
Brill Model 55 Gasoline Cars for Short and Branch Steam Lines

Complete information furnished upon request

The J. G. Brill Company

Philadelphia, U.S.A.

Eastern Representatives: Andersen, Meyer & Co., Ltd., Shanghai, China



The *Tenyo Maru*, built and engined by the Mitsubishi Zosen Kaisha, Ltd., Nagasaki Works

MITSUBISHI ZOSEN KAISHA, LTD., NAGASAKI WORKS

(ex Mitsubishi Dockyard & Engine Works, Nagasaki)

DOCK No. 1			DOCK No. 2			DOCK No. 3		
Extreme Length	523	Ft.	Extreme Length	371	Ft.	Extreme Length	729.9	Ft.
Length on Blocks	513	,,	Length on Blocks	350	,,	Length on Blocks	714	,,
Width of Entrance on Top	89	,,	Width of Entrance on Top	66	,,	Width of Entrance on Top	99½	,,
,, ,, ,, ,, Bottom	77	,,	,, ,, ,, ,, Bottom	53	,,	,, ,, ,, ,, Bottom	88½	,,
Water on Blocks at Spring Tide	26½	,,	Water on Blocks at Spring Tide	24	,,	Water on Blocks at Spring Tide	34½	,,

THE BEST EQUIPPED SHIPBUILDING PLANT IN THE FAR EAST

With Special Facilities for Handling the Heaviest Castings and the Repairing or Building of Ships, Engines, and Boilers
Also Electrical Work

LARGE STOCK OF MATERIAL AND FITTINGS ALWAYS ON HAND

(Article IV). It was stipulated in Article VI that the treaty should come into force on the day on which the contract for the construction and operation of the railway should have been approved and ratified by the emperor of China. . . .

"The English newspapers at Shanghai had published, long before it was signed, the alleged text of the treaty and of the contract. They published another so-called version in the month of October, 1896, some days after the ratification at Peking of the contract in regard to the railway. These various texts, to which the English press gave the name of the 'Cassini Convention,' were apocryphal. They confused the treaty of alliance, properly so called, with the railway contract. . . . The true facts as here outlined establish that there never was, properly speaking, any 'Cassini Convention'; that the treaty of alliance was concluded at St. Petersburg in the month of May, 1896, between Li Hung Chang and Prince Lobanoff; that the railway contract was signed on September 8 following, also at St. Petersburg, by the Chinese minister, Shu Ching Cheng, and the delegates of the Russo-Asiatic Bank; and that it was this contract for whose definite ratification at Peking on September 30 Count Cassini waited before proceeding on his way to Russia."

The full version of the treaty leaves no room for doubt as to its purposes. Outwardly defensive in its opening paragraph it develops rapidly into an offensive arrangement which brought Russia into a position in Manchuria in order to drive the Japanese from Korea. In pursuance of its object and to facilitate the transport of Russian troops to the "menaced points" and to assure an uninterrupted line of military supplies, the Chinese government ceded to Russia the right to construct the Chinese Eastern Railway and surrendered its sovereignty over the railway zone. Later, in 1898, the concession and juridical rights were extended to cover a branch line from Harbin to Port Arthur and at the same time China presented her ally with a naval base at the latter point and gave her a lease to the Liaotung peninsula for twenty-five years. It all followed the original program laid down at St. Petersburg between Li Hung-chang and the Russian authorities. China's principal part in the alliance was to surrender her territory to the stronger military power. This she faithfully carried out before there could be any technical question as to the annulation of the treaty by Russia's participation in the Boxer campaign of 1900. China lived up to her end of the bargain and precipitated the Russo-Japanese war eight years later. These facts challenge refutation. They were available to Mr. Thomas F. Millard but in order to save himself and his previous books on Far Eastern questions from being discredited he persists in suppressing the truth.

* * *

Forcing the Issue

Unless all signs fail the time is not far distant when the world must give heed to the Sino-Russian treaty of 1896, that master piece of secret diplomacy which precipitated the spoliation of China, forced the Anglo-Japanese alliance, the battle of concessions of 1900, the declaration of the "open door" doctrine and the Russo-Japanese war. The conspiracy of silence will be broken when swift moving events compel Japan to fall back on the provisions of this pact and in the light of all that it implies and all that followed as a consequence thereof, demand a re-opening of the entire Manchurian question as the only way to bring about its peaceful and permanent solution. The recent recognition of Russia by China and the former's repudiation of all treaties concluded under the old Czarist *regime* is but another step towards reviving the controversy over the Liaotung lease and Japan's rights in the South Manchuria Railway zone.

Japan is apprehensive that another move is being contemplated to challenge her position in Manchuria; that China will now claim that the lease and concessions inherited from Russia are void and jointly with Russia will insist that the 1915 Manchuria Treaty extending these rights to 99 years, be cancelled. China has already proclaimed this treaty null and void, and called upon Japan to evacuate the Liaotung peninsula. The recovery of the Chinese Eastern Railway as provided for in the recent Sino-Russian understanding will have far-reaching effects if any attempt is now made to coerce Japan into surrendering her rights in Manchuria. A re-opening of these issues based on the illegality of the treaties arising out of the twenty-one demands and Russia's repudiation of old treaties concerning China, must of a necessity carry them back to Portsmouth and a reconsideration of peace terms in which Japan was swindled out of the fruits of victory by the profound secrecy maintained by Russia and China concerning the existence of their alliance.

The issue is bound to arise and when it does it will not be a matter for an international conference or the intervention of any third party. It is matter which exclusively concerns the two principals, Japan and China, one which Japan refuses to discuss with other powers. There is little doubt what the verdict of world opinion will be when the facts of how Japan was buncoed out of her just indemnity at Portsmouth are made public. It is only necessary to recall the wave of indignation which swept over the United States when the American people learned how their government had been maintained in ignorance of the inter-allied secret agreements concerning the disposition of Shantung and the South Sea islands until long after the opening of the peace conference in order to realize that world opinion will stand by Japan when it learns how history has been perverted and Japan robbed of her just rights by the operation of a more sinister type of secret diplomacy which converted Manchuria into the cockpit of the Far East. American opinion justly condemned such tactics and insisted upon a reversal of the Shantung decision and rejected the Versailles treaty itself largely because its government had been made the victim of secret diplomacy. Had the American nation been forced into a disastrous war and brought to the brink of bankruptcy through the operation of secret diplomacy there is no uncertainty as to what their subsequent action would be. Not until the score was evened up and the slate wiped clean would they have been willing to call the account closed.

The Japanese delegates to the Washington conference wisely refrained from commenting upon the text of the secret Sino-Russian treaty when it was read aloud by Secretary Hughes and hurriedly pigeon-holed. It went into the records and stands there as the trump card in Japan's hand ready for her to play at any time China or Russia or the two nations combined questions the legality of Japan's rights in Manchuria. The American government was given firmly to understand before the convocation of the Washington conference that Japan would not consent to any discussion of her acquired rights in Manchuria as part of the agenda and in answer to Dr. C. T. Wang's bill of grievances against the powers which included a plea for the cancellation of the 1915 treaties, Mr. Hanihara very clearly announced this determination on the part of his government and added that it was a question between China and Japan to be taken up at another time. He was very clear on this point. When, later on in the conference Dr. Koo filed the telegraphic summary of the Sino-Russian treaty of alliance and the president hurriedly buried it by immediately taking up another subject, he played into the hand of Japan by making impossible any further discussion of the Manchurian problem before an international conference.

* * *

The Status of the Chinese Eastern Railway

IN view of the circumstances surrounding the convocation of the Washington conference and the general desire to befriend China, it is somewhat understandable why no American desired to stress the real status of a railway having its origin in a military alliance entered into to crush Japan. When it is recalled that the operation of the alliance which created the Chinese Eastern Railway and its branches was the compelling motive for the coming together of Great Britain and Japan in counter-alliance and that the Washington conference was convoked to effect amongst other things the termination of this alliance, it is also understandable why Mr. Hughes, after reading the telegraphic summary of the secret Sino-Russian pact of 1896 hurriedly shifted the subject by asking the delegates if any committee was ready to report. Secretary Hughes, as an expert authority on international law, undoubtedly grasped the full significance of China's official admission which firmly established as a historical fact what had hitherto been

revealed only in unofficial memoirs and newspaper articles and realized in a flash that any discussion of this important document would offset the arguments calculated to prove that the Anglo-Japanese alliance was the root cause of China's troubles and place the blame where it properly belonged. There was therefore every good reason for the chairman of the conference and his advisers to maintain a discreet silence. It was also natural that China's delegates should minimize its importance and divert attention from its bearing subsequent events.

This attitude is clearly shown in Dr. Koo's statement on the Chinese Eastern Railway made before the 6th plenary session of the conference on February 4 (two weeks after he filed the text of the secret agreement) in which he skilfully dodged the question by saying "I will not enter into the origin and the nature of the Railway Company." He could not honestly do this without citing the master-treaty. Further on in his statement Dr. Koo again diplomatically pointed out that the legal status of the railway was expressly defined in the agreements between China and Russia and between China and the Railway Company but avoided any reference to the date or character of the agreements between the two governments, as here again the only direct agreement between the governments of China and Russia concerning the construction of the railway was the secret treaty of alliance. The report of the sub-committee of technical advisers on the Chinese Eastern Railway submitted to the conference on January 23, declared that "the status of the railway is determined by the contract concluded in 1896 between China and the Russo-Chinese (Russo-Asiatic) Bank and the subsequent contracts concluded in 1898. As Dr. Koo did not file the telegraphic summary of the secret treaty until the following day (January 24) it is again clearly understandable why all official reports on the Chinese Eastern Railway submitted to the conference should be based on the assumption that its creation rested solely on the commercial convention, the only document permitted up to that date to appear in the public records. Attached to the above-mentioned report were certain observations and reservations made by Dr. Hawkling Yen, the Chinese representative on the sub-committee, in which he naively remarks that "the construction of this railway by the Russians was obviously for a strategic purpose" but carefully neglected to state the obvious nature of the strategic purpose as to do so would have brought his own country in as a full partner in the military enterprize.

It was true at the time the expert report on the Chinese Eastern Railway was drawn up that its status as far as the world was concerned was determined by the contract between China and the Russo-Chinese Bank but the minute Dr. Koo submitted to the conference the telegraphic summary of the secret alliance, the status of the railway was determined by this master-treaty signed four months prior to the commercial agreement. The character of the railway then changed from a purely commercial undertaking into a instrument of war and as such completely alters its status in international law. Although the master-treaty provides for the building of the railway for the express purpose of facilitating the access of the Russian land forces to the "menaced points" and to ensure their means of subsistance during hostilities, the commercial convention upon which its accepted status is based camaflouges its real purpose by stipulating in Article 8 that "*the company is responsible that the Russian troops and war materials despatched in transit over the line will be carried through directly from one Russian station to another without for any pretext stopping on the way longer than is strictly necessary.*" The commercial agreement designed to throw dust in the eyes of the world as to the real object of the railway was worded so as to create the impression that the transport of Russian troops was to be confined to their transit through Chinese territory from the Baikal to the Ussuri provinces of Russia and *vice-versâ* without stopping on the way, while the master-treaty clearly specifies that the transport of Russian troops to strategical points on the Korean border was the primary object of the enterprise.

In any further discussion over the status of this railway it would seem therefore that the claims of the powers other than China embraced in Resolution XIII of the Washington conference are secondary to the claims that may now be rightfully advanced by Japan to an equity in the property as legitimate spoils of war. Although because of the Portsmouth treaty this equity may not properly include the rights of Russia it can be made to cover those rights now claimed by China and ceded by her to Russia in the recent Koo-Karakhan convention. If China originally conceded the right to construct this railway and surrendered her administrative powers over the railway zone and at a later date leased a naval base and its contiguous territory to Russia all in conformity with the terms of an alliance aimed at Japan and by reason of the profound secrecy maintained concerning the existence of this document, escaped paying an indemnity for her participation in the war that ensued, and eleven years after the expiry of the alliance officially confesses her culpability, then it would seem that common justice requires that serious consideration be given to Japan's equity to a preferred position in the final disposition of the property.

The fact that the Manchuria question was not brought up at the Washington conference; that it was clearly left open as a matter which solely concerned China and Japan; that the conference neglected to discuss the bearing of the secret Sino-Russian treaty on the matters under consideration that would have clarified the situation, gives to Japan the unqualified right to protect her own vital interests when the time is opportune by entering into exclusive negotiations with China for a peaceful and permanent solution to the long-outstanding problems involved in her rights in that province inherited from Russia.

* * *

Justification of the 21 Demands

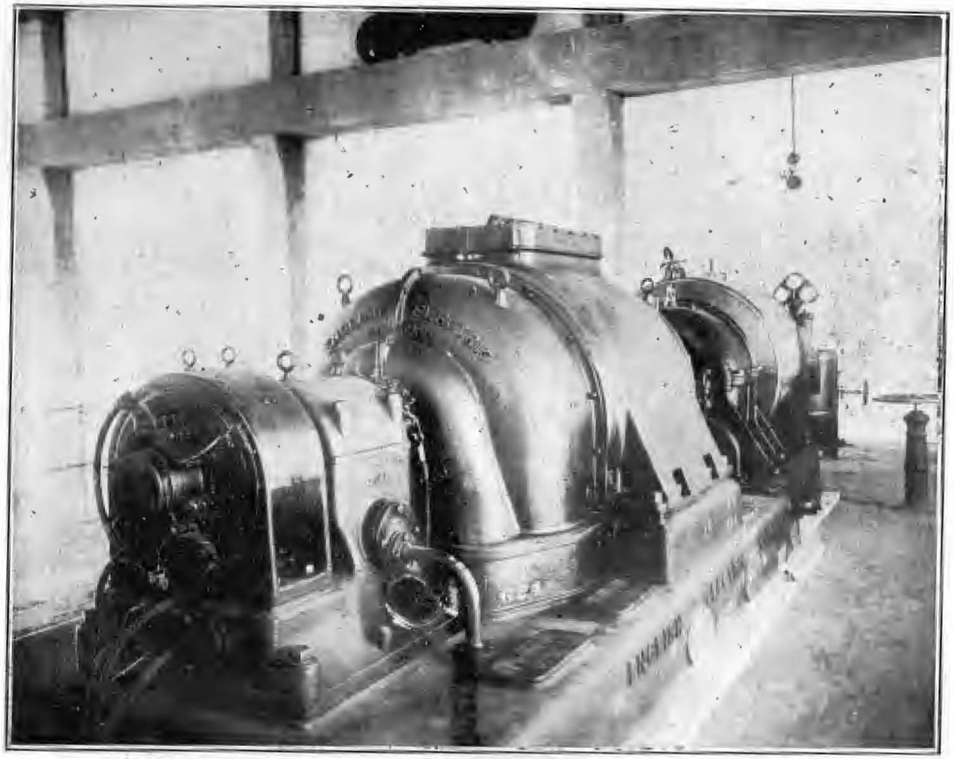
IF we seem to harp on a subject studiously ignored by other writers on Far Eastern affairs it is because we are convinced that no honorable or lasting solution is possible to these problems until the Sino-Russian secret treaty of alliance is accepted as the starting point of the negotiations. With an intimate knowledge of how events shaped themselves immediately after the signature of this treaty and how it provides the key to many otherwise inexplicable moves on the Far Eastern political chessboard which culminated in Japan's presentation of the twenty-one demands in 1915, we remain firm in our belief that only by China's recognition of her own faults accompanied by an honest desire to undo the damage occasioned by her secret diplomacy, can the world look forward to a prolonged era of peace and prosperity in Eastern Asia.

We do not censure Chinese statesmen or their many foreign advisers for putting the best foot forward and striving to conceal or minimize the far-reaching and grave consequences which followed the rash act of Li Hung-chang. We can appreciate how essential it is from the Chinese point of view to base their position in Manchuria on the railway convention and how vital to their interests it is to emphasize at every opportunity the injustice of the twenty-one demands. We can do this because it may be fairly said that nearly every argument denouncing these demands originated from the pen of the publisher of THE FAR EASTERN REVIEW who carried China's publicity campaign in America against the imposition of the demands in 1915. Much of the credit for enlisting the sympathy and support of the American people and their government in China's fight can be justly claimed by THE FAR EASTERN REVIEW. If at this late date we now hold other views it is because facts hidden from us at that time compel a radical and honest change of opinion.

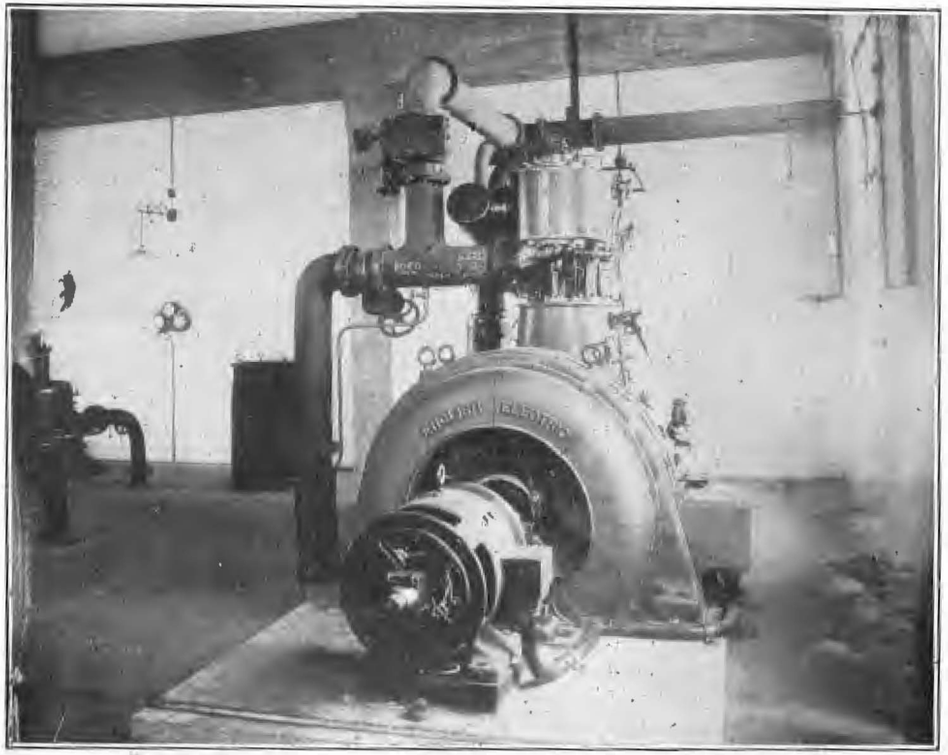
We lay no claim to the title of Far Eastern expert but we may be pardoned for believing that no real expert in the ramifications of international policies in China as expressed through the intrigues of the various powers for railway concessions will dispute our right to speak with certain authority on these matters. The real story of China's troubles has never been told and we make bold to assert that it will never be chronicled by any of the many writers who for the past fifteen years have posed as authorities on Far Eastern affairs. There are just about six men alive to-day who could tell the inside story of the intrigues which split China into spheres of interest and nearly precipitated her partition. These men with one exception (I refer to Mr. J. O. P. Bland) have written no books. Their secrets are the secrets of their governments. Their memoirs will never be published.

These men knew there was a key to the Chinese puzzle and kept their own counsel. That key was not available for the ordinary writer until for the first time at the Paris peace conference the text of the secret Sino-Russian treaty of alliance was made public. Then, only three or four of the many Far Eastern experts gathered there recognized its real significance. Up to that time our own views inclined to the belief that the British railway program in

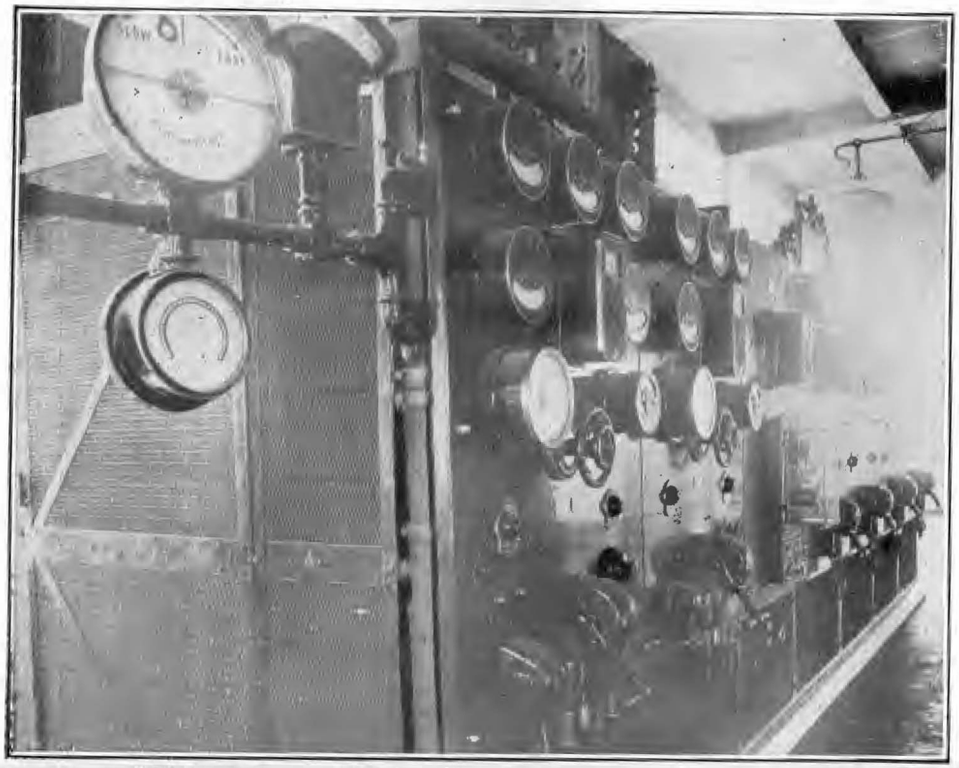
AN ENGLISH ELECTRIC TURBO-GENERATING PLANT FOR THE TIENTSIN-PUKOW RAILWAY INSTALLED BY THE JARDINE ENGINEERING CORPORATION



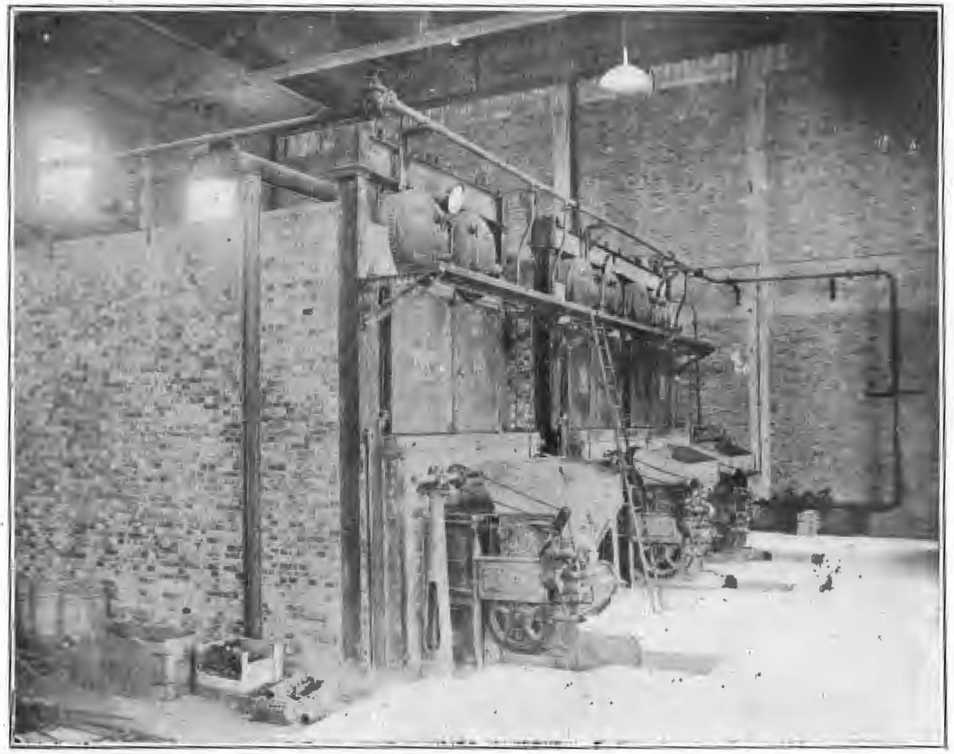
1000 K.W. Turbo Alternator Set Installed in the Pukow Powerhouse



200 K.W. Engine Alternator Set for Carrying the Lighting Load



View of High-tension (6,600 volt) Switchboard in the Railway Powerhouse at Pukow



Boiler Plant—Babcock & Wilcox Watertube Boilers with Superheaters, Chain Grate Stokers, etc.

The Tientsin-Pukow Railway

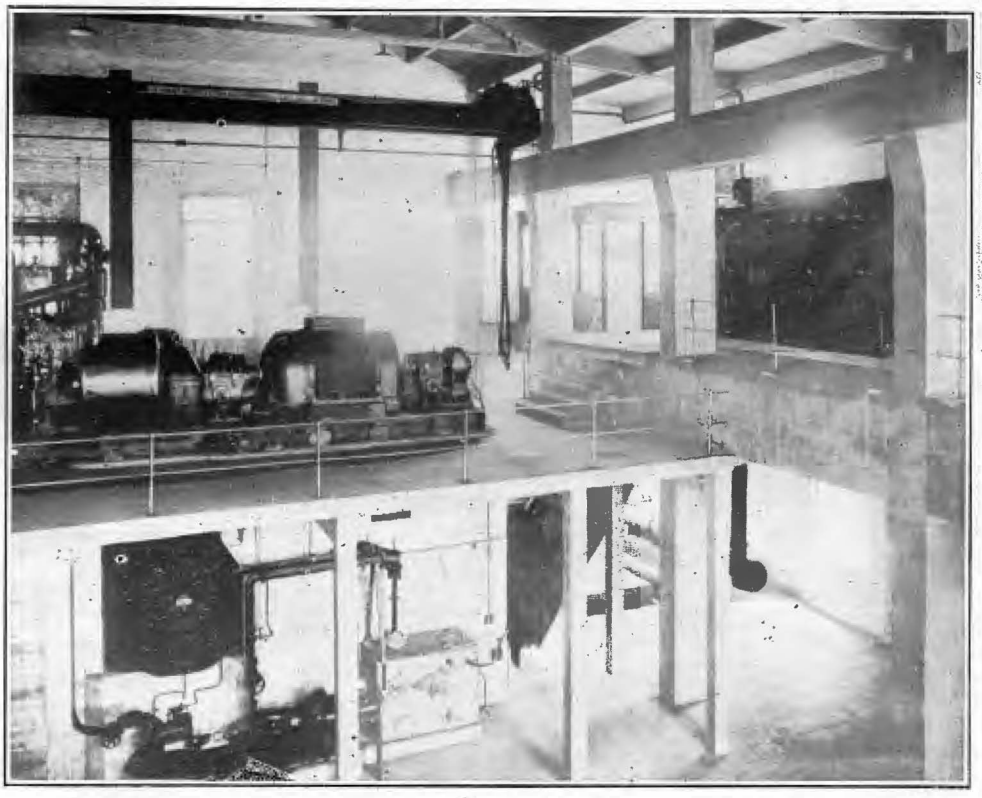
Lighting and Power Scheme

OUR illustrations show the plant installed at Pukow for the lighting and power requirements of the Tientsin-Pukow Railway at Pukow and Puchen. This plant formed part of an ambitious scheme of expansion and development which commenced three or four years ago, embracing the purchase of the well-known "Blue Express;" the purchase of several new locomotives and a large amount of rolling stock; the building and equipping of two large and modern repair shops at the railway's works at Puchen; and the inauguration of a waterworks at Pukow. All these projects have been carried out, and in two or three weeks the lighting and power plant also will be officially placed in commission.

The plant is designed to supply power for lighting the railway wharves, godowns, offices, station, and station approaches at Pukow, as well as to supply power for the workshops at Puchen and for the residences, yards and offices in the vicinity of the workshops. The plant comprises one 1,000 k.w. turbo alternator plant and one 200 k.w. steam engine alternator set, the former to carry the day load provided by the power requirements of the workshops, and the latter the lighting load which comes on at night time.

The boiler plant comprises three Babcock & Wilcox watertube boilers each of 2,852 sq. ft. heating surface, with superheaters, mechanical chain grate stokers, economiser, motor-driven Sirocco induced draught fan, and Weirs feed pumps. The boilers are designed for a working pressure of 200-lbs. per sq. in., with 200° F. of superheat. A feed water heater has been installed using the exhaust steam from the feed pumps and stoker engine.

Power is generated at 6,600 volts 3 phase 50 cycles and transmitted to Puchen at the same pressure by means of two 625 k.v.a. overhead feeders. The high-tension lines are carried underground for a quarter of a mile at each end to prevent obstruction and at the same time protect the plant from lightning.



GENERAL VIEW OF ENGINE ROOM
1000-k.w. Turbo and Condensing Plant. Switchboard on Right

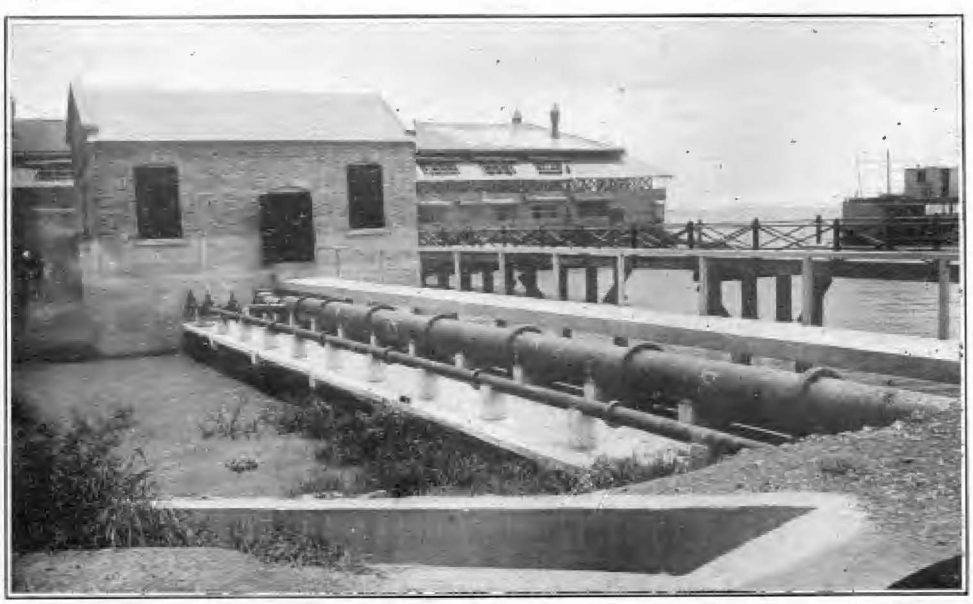
At Puchen the power is stepped down to 550 volts for distribution to the motors in the workshops, and to 380 volts for lighting, a three-phase four-wire system being adopted. There are two power transformers of the standard oil immersed type, each of 625 k.v.a. capacity 6,600/550 volts; and one lighting transformer of 50 k.v.a. capacity, 6,600/380/220 volts.

The lighting at Pukow is provided for by one 100 k.v.a. transformer, 6,600/380/220 volts, placed in the power station, from whence the low-tension 3-phase 4-wire distributors are taken. A 125 k.v.a. transformer, also located in the power house, provides power for the station accessories.

The main switchboard in the station is of the remote mechanically controlled type, the high-tension gear being enclosed in steel cubicles behind the control panel. The switchgear in the Puchen substation is of the ironclad truck type. The high-tension system is ungrounded.

The entire contract including the supply and erection of the power plant, substation gear, transmission lines, distributors, and wiring of godowns, wharves, houses, etc., has been executed by the Jardine Engineering Corporation, Ltd. The turbo plant, steam engine-generator set, transformers, switchgear, and motors were manufactured by the English Electric Co., Ltd., and the boiler plant by Messrs. Babcock & Wilcox, Ltd.

We are indebted to the Tientsin-Pukow Railway Administration for permission to publish this article, and to the Jardine Engineering Corporation, Ltd. for the photographs and several of the technical details described.



PUMPHOUSE FOR CIRCULATING WATER
Located on River Bank—Vertical Spindle Pumps are used owing to large rise and fall of the water

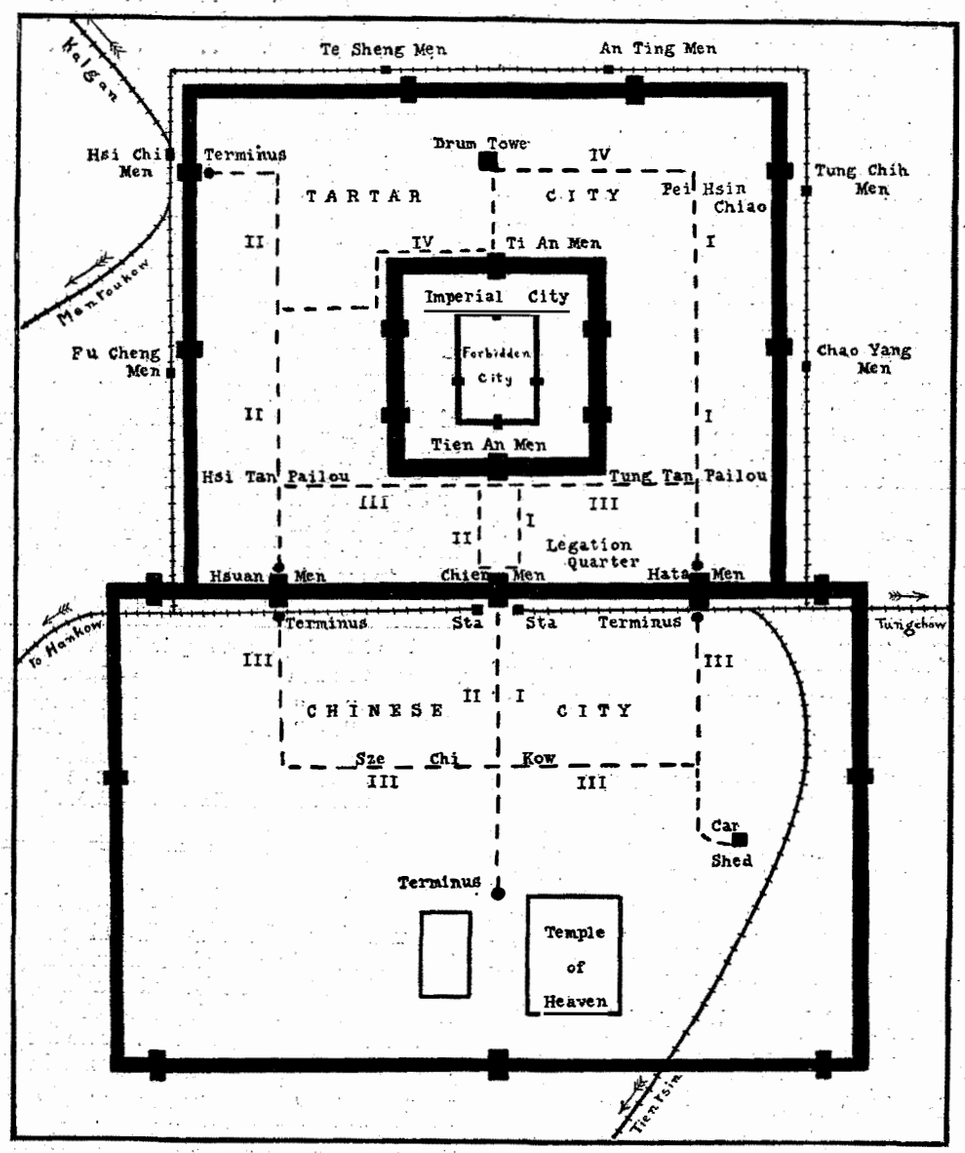
The Peking Tramway System

Modern Developments in the Ancient Capital of China

By Laurence Impey

IT is over ten years now since the first agreement relating to the construction of tramways in Peking was signed by the Chinese ministry of finance and certain French interests represented by the Banque Industrielle de Chine, and it is an excellent example of the Oriental policy of *laissez faire* that even now the completion of the undertaking is not really in sight. It is true that some of the construction work has been done, and that at the present time some fifty kilometres of track has been laid, but the rest of the installation is proceeding in so leisurely a manner that it will probably be necessary to commence repair work on the first stages before the last ones are in place. The initial delays to the work were undoubtedly political in their origin, and if a full account of these is ever made public it will afford an interesting insight into the peculiarities of commercial enterprise and development as practised in China.

The scheme as originally outlined in the port of Pukow agreement was feasible enough of course, and it was presumably only the outbreak of the war that prevented its being put into execution immediately, but this unexpected development, by the pressure which it exercised on French finance, naturally altered the whole trend of affairs and caused the agreement to be held in abeyance until the spring of 1921, at which time a new contract was drawn up and signed by the ministry of finance and the Banque Industrielle de Chine.



Map of Peking Tramway System

The fact that such a profitable undertaking had been secured by French interests had of course considerably disappointed various other financial and engineering groups, and the hindrances in organization presented by war conditions afforded an excellent opportunity to these disgruntled competitors of which they were not slow to avail themselves. The opposition was considerably strengthened by the financial difficulties of the Banque Industrielle during the latter years of the war, and it was apparent that the climax had been reached when in May 1921 the Banque was forced into involuntary suspension.

The first move to follow was the appointment of a German engineer to take charge of the work on behalf of the company, and this event produced reactions which have proved to be of the utmost importance since. Specifications were immediately drawn up for the materials required and these were so worded by the engineer as to comply with standard German construction work, thus enabling German firms to submit tenders in the short space of time allowed and greatly hampering other foreign firms who were desirous of submitting plans and bids. In spite of the fact that French interests eventually regained the supremacy this action was of vital importance in the long run, as is evidenced by the number of tenders which were secured by Germans in the face of considerable opposition. The following short list gives some idea of the predominance of Germany along certain lines in engineering construction in China, and may serve to disprove those assertions which have lately appeared in the press to the effect that German commercial and financial interests in the Far East are almost negligable in importance.

Contract No. C.—Convertor Station Transformers. Siemens-Schuckert & Co. (German)

Contract No H.—Winding Shop. Siemens-Schuckert & Co.

Contract No I.—Joinery, Shop. Chinese Commercial Corporation. (Kirchner) German.

Contract No L.—Repair Shop. Siemens-Schuckert & Co.

Contract No N.—Overhead Line Equipment. Siemens-Schuckert & Co.

Contract No F.F.—Transmission Signals Equipment. Siemens-Schuckert & Co.

Contract No K.K.—Precision Testing Instruments. Siemens-Schuckert & Co.

Examination of the complete list of tenders shows that the German group have secured seven to the French four, the British having obtained six and the Chinese the same number; and it is reasonable to suppose that the French interests that now control the work would not have approved this if it had been possible for them to arrange for some emendation or to call for fresh tenders.

The financing of the scheme has involved considerable difficulty owing to the suspension of the Banque Industrielle, for the original arrangement was that the shareholders should provide one half of the funds required, while the ministry of finance, representing the Chinese government, should not be liable for any direct payment but should be carried by the Banque acting as its financial representa-

tive. The first and second calls issued by the company amounted to two million dollars, the third one called for another five hundred thousand, and up to April 1924 a total of four million dollars Mex has been called up and expended, while the directors are now considering the adviseability of asking for another million dollars in the immediate future.

It is somewhat surprising, when one considers the unsettled conditions in China, that the private shareholders have been willing to provide such an amount, secured as they are only by the materials of the tramway itself and certain of the municipal taxes of Peking, which might very well not be forthcoming in case of necessity. These financial details are, however, of somewhat secondary importance, for the tramways are now in the nature of a "fait accompli"; and it is far more interesting to consider the actual engineering and construction details of the work now under progress.

The general plan of the system is to install a power plant at Tungchow, some sixteen miles from Peking, and by obtaining water from the upper reaches of the Pei Ho and passing it through a large settling tank enable them to operate three Babcock & Wilcox water-tube boilers for the turbo-generators. These boilers have a heating surface of 4,400 square feet and a working pressure of fourteen atmospheres (210-lb. pressure). They are fitted with economisers and chain grate stokers. The three turbo-generators which were supplied by the Swiss firm of Brown Boveri & Co. will provide 3,000 kilowatts, one being of 1,500 kilowatts and the other two of 750 kilowatts apiece; while space has been reserved in the building during construction for the installation of another group of 3,000 kilowatts which it is expected are to be ordered shortly. The generated voltage of 5,000 volts is stepped up to 33,000 volts for transmission from Tungchow to Peking by extra high-tension cable, and is stepped down again at the Peking transformer station close to the Hatamen gate. The total cost of the installation at Tungchow is in the neighborhood of $200,000, while the buildings for the housing of the engineering staff, together with the settling tank which is not yet erected, will cost another $200,000.

The current from the transformer station at Hatamen is passed to the two convertor stations at Nan Ho Yen and San Li Ho in the south and north Tartar city respectively. Here it is converted from alternating to direct current, the south station having two Hexaface rotary convertors with a capacity of 375 kilowatts at the D.C. side and a voltage of 615, while the north station has two Hexaface rotary convertors of compound winding with commutating poles and a capacity of 225 kilowatts at the D.C. side and a voltage of 615 as in the other installation. These two stations are not yet completed, but it is expected that they will be working by August next if not earlier. The capacity of the whole of the electrical plant both at Tungchow and in Peking is well above the requirements of the tramway system as at present projected, but it is expected that there will be an ever increasing demand for its services once it is operating, while it is also suggested that it might be possible to use the surplus current for an electric light supply in the future, the present one being somewhat inefficient, both in capacity and operation.

The laying of the track has been completed already, the rails used being of the grooved type with a weight of forty-seven kilogrammes per metre, though a lighter type of trail has been employed for the track to the car sheds and repair shop. The joint for the rails is made with the usual fishplate and an electrical joint of 50 m.m. copper wire, electrical thermit welding such as is used in America and England not being practised in China as yet owing to the lack of equipment and skilled workmen. It is very unfortunate that the surfacing between the tracks is not of better quality, the stone from the western hills quarries proving to be somewhat soft and yielding very rapidly to motor traffic, while the harder stone which has been employed in some parts of the work does not amalgamate well with that of the road previously constructed by the municipality. It would appear that some difficulty may arise on this point, for the understanding is that the tramway company is responsible for maintenance only on the portion of road occupied by their track, which will result in dual repair work being undertaken with an inefficient joint resulting at the point of contact.

It is obvious that there must always be troubles encountered in such an undertaking, where a modern enterprise is grafted onto the organization of an ancient city, and this is the case in more ways than one in Peking, for not only have the ancient and uncharted city sewers put in by Chien Lung cropped up here and there to obstruct the track work, but the old wooden pailous which have ornamented the streets for so long have proved to be too low and too narrow to permit of the passage of the tram traffic, and in two cases at Hsi Tan pailou and Tung Tan pailou they have had to be removed altogether. This traffic difficulty has again been encountered at the passage of the city gates at Hatamen and Hsuan Men, for the gate is here so narrow that in any case it would only be possible to use a single track and this would obviously impede both the ingoing and outgoing vehicles at the same time. Added to this there is the fact that at Hatamen the track would have to cross the Peking-Mukden railway at street level, and at present it has not been possible to obtain the consent of the railway company to this, so that the tramway line has had to use a terminus both inside and outside the gate. The same thing applies to the track at Hsuan Men, only in this case it is even more difficult to operate satisfactorily from the fact that the existing road beside crossing the railway also makes a right angled turn in the approach to the city gate through a bastion, thus rendering a through line impossible without destroying a portion of the city wall, which is not likely to be approved by the authorities under the present unsettled political conditions.

Thus it will be seen that the routes as laid down on the plans and numbered from I to IV are to a certain extent provisional, and may particularly require modification in regard to route III, on which passengers will have to change cars en route to the Tartar city or *vice versâ*. The total length of the whole system is approximately thirty two kilometres, but in all over fifty kilometres of track will have been laid when the work is completed and the sidings and branches to the car sheds are put in. The sheds themselves are not yet finished owing to an error in construction on the part of the Chinese contractors, but it is estimated that they will be ready by August and will then have a capacity for one hundred and twenty cars in all, of which number sixty trailers and thirty motors are now on hand and in process of assembly. The repair sheds are in the same stage of progress and the total cost of the two buildings will be approximately $190,000. The cars to be used are the *Brill* type 21 E, and each is fitted with a 30 horsepower motor of 550-600 volts D. K. type. The brakes are both hand and electrical and are fitted by a French firm and are therefore not of the usual Westinghouse pattern.

The cars themselves are divided into two by a sliding door, the first class having a capacity of ten passengers seated and six standing in the forward portion, while the second class takes eighteen passengers seated and twelve standing in the rear part of the car. As the traffic increases the trailers will be attached to the original cars in order to cope with the extra numbers. What the fares in the different classes are to be is not yet finally decided, but it is thought that the length of a stage will be approximately six hundred metres, and from this one may make a rough estimate as to the possible cost of transportation. A rickshaw fare for the same six hundred metres in Peking would be about six coppers or slightly under ten cents a mile, and it would be necessary for the tramway company to underbid this charge if they really expect to cut out the rickshaw service, which it would seem must still be used in a number of cases owing to the fact that a large percentage of journeys do not follow the main roads altogether, but pass across them from one small hutung to another.

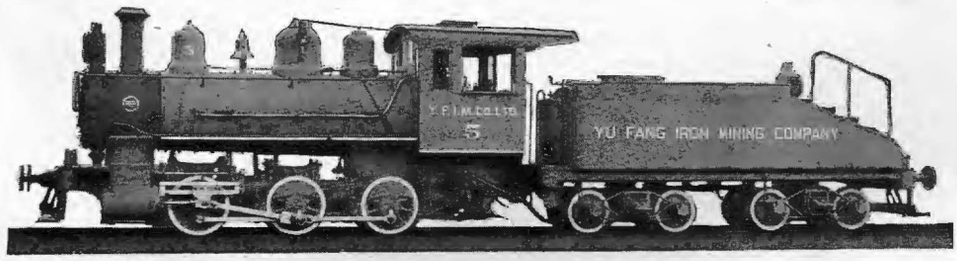
There will however be a considerable passenger traffic from all parts of the Tartar city to the main business centre outside Chien Men, and also from all parts of both the Chinese and Tartar cities to the railway stations at both Chien Men and Hsi Chih Men, while the theatre district in the area north west of the Temple of Heaven will doubtless be responsible for extra traffic at certain times of the day. As most of these journeys will be long distance runs where time is an essential the trams will probably take very much of the work in this direction which is at present handled by the rickshaws somewhat unsatisfactorily, leaving them the monopoly in short distance hauls where the time saving to be effected is inconsiderable.

It will be interesting to note how the receipts of the tramway company are handled a few months after opening up, for of course these receipts are primarily responsible for the payment of shares and the maintenance of the rolling stock and track, which would not seem to leave overmuch for the customary Chinese "squeeze" on the part of the various officials of the metropolis, unless, as is more than probable, the system is allowed to deteriorate slowly and surely after the manner of most foreign innovations and installations in China when they fall into the hands of the Chinese themselves.

BALDWIN

Six-Wheeled Switchers

Used in the Development of the Iron Industry of China



Built for Yu Fang Iron Mining Co., Ltd., China

Gauge, 3′6″
Cylinders, 14″ × 16″
Working pressure, 180-lb.
Driving wheels, diameter, 36″
Weight, engine, 55,300-lb.
Weight, engine and tender, 110,000-lb.

THE Six-wheeled Switching locomotive illustrated was recently built by these Works for the Yu Fang Iron Mining Co., Ltd., for use in hauling large quantities of ore from the mines at Fanchang, Anhwei Province, China, to the Yangtsze River.

Among the features embodied in this type of locomotive are sturdiness in construction, adequate power for the service intended, and accessibility to all parts to facilitate repairs.

Baldwin Industrial Railway locomotives are giving good service in many countries.

The Baldwin Locomotive Works

PHILADELPHIA, U.S.A. *Cable Address*: "Baldwin, Philadelphia"

OFFICES:

J. M. Wright, Bandoeng, Java, D.E.I.
J. W. Kelker, Harbin, Manchuria

AGENTS:

Andersen, Meyer & Co., Ltd., Peking and Shanghai
Sale & Frazar, Ltd., Tokyo and New York

RESIDENT TECHNICAL REPRESENTATIVES:

R. E. McFalls, Peking, China
E. P. Williams, Jr., Shanghai, China
J. F. Greig, Tokyo, Japan

1131

LOCOMOTIVES

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

P. CHIERI 1924

VIOLATION OF THE BOXER PROTOCOL

Safety of Foreign Lives and Properties, Success of International Co-operation and Sanctity of Treaties Impaired by Independent Remission of Indemnities

CALL A CONFERENCE OF THE PROTOCOL POWERS AND BUILD RAILWAYS

Willard Straight
Japan's Answer to America
Remarkable Change in America's Foreign Trade
Japan's Reconstruction
Japan's Textile Industries
Shuang Chiao Wireless Plant
Manila's Tramways and Water System

上海仁記路第五號

遠東時報

Vol. XX | July, 1924 | No. 7

A. L. STAYLER.

The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XX SHANGHAI, JULY, 1924 No. 7

CHIERI 19

Build China's Railways

A Practical Use for the Boxer Indemnity

The Safety of Foreign Lives and Properties in China, Success of International Co-operation and the Sanctity of Treaties Rests Squarely on Faithful Observance of the Terms of the Boxer Protocol

Violation, repudiation and the shirking of international agreements and obligations is becoming such a commonplace that almost any powerful government can desert its associates with impunity. The world perhaps is moving towards the goal of universal peace through the creation of a league of nations or a world court, implying a willingness on the part of members to abide by its decisions and carry out their obligations. Can an international court or the council of the league compel obedience to its mandates if any one of the larger powers decides that its special interests can be better advanced by breaking away from its associates? Consider this question in its application to China. International intervention is again being urged as the solution to China's troubles. The purpose of this article is to prove that such a remedy cannot be applied with any assurance of success except when it is preceded by an irrevocable and solemn understanding between all the powers to stand with each other and share equally all responsibility until China is once more able to fulfill her treaty obligations.

It is pertinent and timely to ask the question: What is the sum total of the claims now filed with the foreign legations in Peking, representing the cash value of foreign lives, damages to properties and losses incidental to illegal taxation, interference with trade and treaty rights and other injuries not included under the head of defaults of interest and principal on loans or failure to pay commercial obligations? It is not too much to state that at the present moment when the powers are devising methods to release China from the Boxer indemnity that claims totalling Taels 100,000,000 have piled up in the various legations, and with no prospect of ever being paid.

THE controversy over the best way to spend the unpaid portion of the Boxer indemnity for the benefit of China raises a point of international law whose proper settlement is imperative for the future success of international co-operative movements and calls for the immediate convocation of a conference of those powers whose joint military action and diplomatic pressure brought China to her senses in 1900. Full and loyal co-operation between all foreign powers was the only weapon which saved the legations and forced the Manchu rulers to accept the joint note of December 22, 1900 with its demand for a lump sum indemnity as compensation for the loss of lives and damages to foreign properties during the Boxer outbreak. The note was signed by the representatives of Germany, Austria-Hungary, Belgium, Spain, United States of America, France, Great Britain, Italy, Japan, Netherlands and Russia and compromised each signatory to stand with its associates in exacting compliance with the indemnity terms until fully carried out.

In the Protocol, the Chinese government agreed to pay the lump sum indemnity of Taels 450,000,000 as stipulated by the powers in their joint demands. A subsequent protocol signed on June 14, 1902 and to which China was not a party, apportioned this lump sum amongst the powers according to their estimates of damages. As far as China is concerned her obligations are to all the powers—not to any one signatory. The protocol recognizes no individual indebtedness, therefore any modification of its terms or remission of the amount apportioned to any one power would seem to be a matter which concerns exclusively those powers who signed the protocol of apportionment. The withdrawal of any one power from the international concert by negotiating direct with China not only impairs and invalidates the main treaty but makes extremely difficult that harmony and accord essential in carrying out other international undertakings.

We find, however, upon final adjudication of its claims, the American government found that they totalled less than the amount of the indemnity apportioned to it and in May, 1908, the bond received from China amounting to $24,440,778.81 was reduced by congress to $13,651,492.69 and the president was authorized to remit this to China as an act of friendship. In acting on its own initiative and without consultation with its associates, the action of the American government no matter how otherwise justified, would seem to be contrary to the spirit of the joint note of December 22, 1900 under whose "irrevocable" provisions the payment of the total indemnity by China was made possible.

America is therefore placed in the position of being the first to break away from its international committments and in so doing furnished a precedent that has been taken advantage of by China and other powers to destroy the efficacy of the instrument designed to inspire respect for foreigners and their rights in this country. The German and Austrian portions of the indemnity were wiped out as a result of China's participation in the war on the side of the allies. Russia has voluntarily surrendered her claims; France will employ her portion for guaranteeing the obligations of the Banque Industrielle de Chine, Great Britain and Japan are formulating

plans to employ their shares in cultural and other propaganda, so it may be said that international solidarity for the protection of foreign rights in China has practically disappeared.

With the larger powers shirking their responsibilities under the protocol, what chance has Belgium, Spain, Italy and the Netherlands for collecting the balance due them ? These smaller nations will be penalized in order that their stronger partners may derive special benefits from China at their expense. Such a conception of international co-operation will help to understand why it is now so difficult to bring about united action in the diplomatic corps at Peking.

At a time when international co-operation is most essential to the peace of the Far East and the proper development of China, anything which tends to weaken such united action should receive serious consideration, especially by America who now stands as the champion of international co-operation after withdrawing from the most vital undertaking entered into jointly by the powers for safeguarding foreign interests in this country. If the larger powers are to follow the lead of America and remit their share of the Boxer indemnity for special purposes, it is a matter which deeply concerns the smaller powers, one which properly should be made the subject of an international conference in which the United States could have no voice unless its government recognizes and admits its responsibilities under the original agreement and withdraws its right to act independently. China has no right to participate in such a conference. She ean accept or reject whatever plan is agreed upon, but the chances are that any proposition which relieves her of the payment of the indemnity and at the same time conduces to her own benefit will be cordially received.

It is a significant fact that the protocol powers are now standing solidly together in refusing the request of the Chinese government to turn the old Russian legation over to the Soviet. The point involved goes squarely back to the demands submitted to China in the joint note of December 22, 1900 and the protocol which placed the entire legation quarter under foreign jurisdiction or extraterritoriality, an obligation on the part of China to *all* the powers from which no one power could recede and undermine or destroy the rights of the others. Now that the Soviet government of Russia has surrendered its extraterritorial rights under the new treaty with China carrying with it the extension of the principle into the Russian compound in the legation quarter, we find that the other protocol powers insist upon joint control over the property as part and parcel of the original deed of cession granted under the joint demands.

In plain words, the present attitude of the powers fully supports our contention. If the rule of solidarity is applied in order to preserve intact one clause of the protocol, it must also extend to any independent remission of an indemnity which as a lump sum was conceded by China to satisfy the joint claims and afterwards apportioned between the powers according to their own estimates of damages. If no one power can now impair the rights surrendered by China to joint jurisdiction over the legation quarter, no one power should be permitted to vitiate that clause of the protocol which acknowledges a lump sum idemnity. The obligations in both cases are identical.

The principle is the same as though one of the allies in the late war should now experience a change of heart and in order to advance its special trade or other interests with the central powers, suddenly discovers that its claims for reparations were grossly exaggerated and surrenders its claims and rejects any responsibility for the collection of the amount due to its allies. There is absolutely no difference in principle between such procedure and the action of the powers in breaking away from their committments under the Boxer protocol.

An international conference of the indemnity powers should now be called. The danger to Chinese nationalism through the propagation of conflicting ideas of education, culture and politics should be recognized and some utilitarian program agreed upon that will bring the greatest good to the greatest number. An international agreement providing for the expenditure of the Boxer indemnity balance for new railway construction under the supervision of a technical head appointed by the powers concerned, would materially help to straighten out the complicated railway tangle and pave the way for a wider application of the principle of foreign supervision over loan built lines.

Although the United States is now the principal advocate of international co-operation in China, there is no telling when our government will again denounce entangling alliances. American policy in this respect has been as unstable as water, the other powers never knowing what we would do next. Our failure to work in harness has since been emphasized in the senate's rejection of the Versailles treaty which abandoned our allies to work out their salvation in their own way and plunged Europe into a financial chaos which will take many weary years to straighten out. All this has a most important bearing on the present tendency to bring about further intervention in the affairs of China.

The American and British chambers of commerce of Shanghai, the American association of China and the China society are a unit in demanding firm co-operation between the powers in order to counter the ignoring of treaties, imposition of illegal taxation, outrages upon foreigners, banditry, piracy and other evidences of unchecked lawlessness that have many points of similarity with conditions leading up to the former catastrophe which compelled the powers to act in unison for the defense of foreign lives and property. Behind the shadowy pretense maintained in Peking by the war-lords to stave off the demands of foreign governments, defiance of the treaties is practised with impunity and the menace to foreign lives grows daily more alarming. It is this very impunity from chastisement and the payment of indemnities which encourages the war-lords to continue to flout the treaties and stand together as one man in defense of any of the bandit oligarchy who resort to Boxer methods in showing contempt for the foreigner.

Is international intervention the remedy for this state of affairs ? Granted that the business-men of Shanghai are right, what guarantee has a coalition of powers that one of the partners will not break away from any new pact, repudiate its share of the responsibilities and reinstate itself in the good graces of the Chinese at the expense of the others ?

There is no use shutting our eyes to essential facts. The record of murders, outrages, piracies, and other high crimes against foreigners these past few years will call for another huge lump sum indemnity and this can only be extracted from China in the same manner as the Boxer damages—by the concerted and firm action of all powers. It is not too much to state that the total of these new claims for damages will exceed Taels 100,000,000. Yet with this truth before us, we are witnessing a wild scramble on the part of these very same powers to release China from the indemnity imposed upon her in 1900. We have listened intently, but have heard no voice in high places advocating the employment of the Boxer funds to satisfy these new claims for damages. The powers fully understand that China is bankrupt, that even the expenses of government at Peking are unpaid, yet the claims for new damages against foreign lives and properties keep mounting up higher and higher with no possibility of their being paid for another generation. By that time or probably long before, another frenzy of repentence will be started by the missionary element and the score again wiped out.

It is useless therefore for foreigners to call loudly for concerted action between the governments for the protection of their treaty rights unless such action be preceded by an iron-clad and irrevocable understanding that no single power will recant or repent and double-cross its associates by releasing China from the penalties imposed in order to further its own special ends in this country. If such a program could be entered into and faithfully carried out, concerted intervention would probably clear the atmosphere and usher in a new era in the Far East. If it cannot be agreed upon, foreigners may as well forget about it and settle down to make the best of a bad situation.

It would seem that if the United States hopes to attain cordial co-operation with other powers in the reconstruction of China she would do well to reconsider her stand on the Boxer indemnity and join with her protocol partners in a new conference based on the terms of that instrument in order to determine the best method of releasing China from the indemnity obligations imposed upon her through concerted action. As far as we see, there could be no objection on the part of the United States if at this time the other indemnity powers come to an understanding for the utilization of the unpaid balance of their share of the indemnity for railway purposes, and as a guarantee that the agreement will be lived up to faithfully by China, impose the employment of another foreign adviser with the rank of inspector-general of indemnity railways which may lead in the future to the application of similar supervison over the other European loan-built railways on which the principal and interest is being defaulted.

This phase of the question is one which Americans may not lightly ignore. America stands before the world as the champion of international co-operation in China, the leader of the new consortium in which is pooled practically all the outstanding agreements for the financing and construction of new railways in this country. Some day the consortium will be prepared to function and its greatest difficulty will be found in inducing the Chinese to accept its ideas of supervision over the expenditure of the loans and the direction of the railways when completed. These guarantees the Chinese will not be disposed to give, so any international program which will pave the way for the proper investment of foreign money for railway purposes should merit serious study. Once the Chinese are convinced that such guarantees will not be employed to further impair their administrative independence and that supervision is essential if the country is to be developed with foreign loans, they will look with a greater sympathy on the viewpoint of the consortium.

The application of the combined Boxer indemnity funds to some such program under the direction of a foreign inspector-general would do more towards convincing the Chinese of the necessity of such supervision than anything else. It can be done. China is in no position to reject such an offer and the United States, as leader of the consortium, should take the initiative by reconsidering the manner in which she has broken away from her indemnity partners and join with them in a constructive program upon which, to a large extent, will depend the success of the consortium, and our diplomatic prestige in China.

America expects other powers to live up to the joint obligations imposed upon them through the consortium and the four-power and nine-power treaties. In these matters, faithful adherance to the principles involved are calculated to preserve American ideas of what is best for themselves and for China. Other powers are, however, more interested in the material development of China than in her cultural and educational progress. America has broken away from her associates to advance her special cultural interests at their expense. The time has arrived when there should be a coming together on these matters and if America expects cordial and loyal co-operation, there should be some reciprocity, some sacrifice of our ideals for the benefit of our associates. This article shows a practical way out, one that can be applied with advantage to all. At the rate we are going, the present generation will be dead and forgotten by the time the consortium is ready to function. In the meantime, China rots and decays for lack of transportation facilities, while foreign firms are being forced one by one to the wall through China's inability to pay her obligations. Education, sanitation, cultural and spiritual uplift will not solve the problem. Loans to China at this time are out of the question. Colleges will not build railways but railways will build colleges. Let the Boxer indemnity do the work.

G. B. R.

* * *

Why Waste the Boxer Indemnity on Education?

Build Railways and Provide Employment for the Masses

(CONTRIBUTED)

IT is now five years since the consortium was organized to finance China and its attitude remains uncompromising in regard to loan terms. China harbors the delusion that her undeveloped resources conceal the world's last Eldorado and with her credit ruined, dreams of borrowing money for railway construction on the old unrestricted Pukow terms. In the meantime, she is trying to advance along her own lines. Education has made great strides ; the clerical classes are rapidly increasing and the professions are crowded out of all proportion to the demand. There are three government colleges devoted to the education of civil and mechanical engineers, railway traffic officers and employees of other government services. From these institutions graduate at least one hundred engineers annually and a still larger number of embryo traffic officials, all relying upon the government to furnish them employment. In addition, there are the returned American students to be provided for. The government does its best to meet these expectations and the effect of its philanthrophy is well illustrated in the enormous increase in railway personnel since 1916. The following table is illuminating :—

Year	Kilometres worked	Personnel	Trains per day
1916	.. 7,049	59,857	11
1919	.. 7,183	73,651	11
1922	.. 6,279	91,356	12

It is seen that in 1922 with less mileage operated than in 1916 and with only a slight increase in traffic, the number of railway employees has almost doubled. Here we have the logical consequences to the Chinese system of dual control which breeds nepotism of the worst kind and to the weak handling of the bolshevist labor agitation (arising in large part from an over production of college educated employees) which culminated in the disturbances of October 1922. Since the abolition of the old classical examinations in 1904 the student problem has been a nightmare to the Chinese government. The examinations were revived in 1906 but the successful candidates were never employed by the government. Yuan Shih-kai saw in the student class a dangerous political element and found employment for a selected few in order to bind them to his cause. These men have been willing recruits to the various militarist factions which have grasped the reins of government during recent years. The student class throughout the country has developed into an element of unrest, instigators of agitations against foreigners and meddlers in international relations. Their record is one of childish intervention in politics, of college and school strikes and disobedience to their tutors. The government has always temporized before this insubordination and applied local solutions when the problems became acute. Yet in the face of this record the foreign powers now propose, though the use of the Boxer indemnity for educational purposes, to add to the embarrassment of the Chinese government by reinforcing an element already far in excess of national requirements.

To those at all conversant with the condition of the Chinese government services this can only appear as a futile waste of money. The only way to put the Boxer indemnity to useful purposes is to create employment, not only for the technical graduates but for the masses, by allocating the annual interest on the total of the fund to the construction of new railways in accordance with a fixed program supervised by a technical adviser appointed by the powers concerned. According to official returns the Boxer indemnity in January 1920 was apportioned as follows, calculating the French, Italian and Belgian portions at 25 francs to the pound sterling and omitting the minor claimants :—

Great Britain	£11,180,000
France	17,650,000
Italy	5,920,000
Russia	30,760,000
Japan	7,530,000
Belgium	1,870,000
Total	£74,910,000

Deducting Russia's share and disregarding amortization, there remains the annual interest at four per cent. on £44,150,000 to devote to railway construction, or £1,766,000 equivalent to approximately $14,000,000 silver. Unquestionably, the most urgent railway project is the completion of the Canton-Hankow line, upon which depends the unification of North and South and the development of Canton. For similar pacification purposes and the elimination of the Yangtze above the gorges as a highway of trade, the construction of the Hankow-Szechuan railway is next in importance. These two projects should have the first claim on the remitted Boxer indemnity. With 60-lb. rails at the current price of $100 (silver) a ton ; bridges and culvert openings totalling 90 feet per mile and embankments and cuttings averaging ten feet in height or depth, the present day costs of railway construction in China is $75,000 per mile, exclusive of rolling stock, or, $85,000 per mile fully equipped. The heaviest work would increase the cost to $100,000. The annual interest on the total of the Boxer indemnity could therefore construct a minimum of 140 miles of line a year or a maximum of 180.

Such a program would provide employment for thousands of workers, bring incalculable benefit to Chinese and foreign trade and infuse new life into the railway service now suffering from stagnation and overcrowding. The indemnity powers should insist on the faithful execution of the yearly program and extract guarantees that the revenues from the lines so constructed are allocated for new equipment or additional construction. Under such a program

This phase of the question is one which Americans may not lightly ignore. America stands before the world as the champion of international co-operation in China, the leader of the new consortium in which is pooled practically all the outstanding agreements for the financing and construction of new railways in this country. Some day the consortium will be prepared to function and its greatest difficulty will be found in inducing the Chinese to accept its ideas of supervision over the expenditure of the loans and the direction of the railways when completed. These guarantees the Chinese will not be disposed to give, so any international program which will pave the way for the proper investment of foreign money for railway purposes should merit serious study. Once the Chinese are convinced that such guarantees will not be employed to further impair their administrative independence and that supervision is essential if the country is to be developed with foreign loans, they will look with a greater sympathy on the viewpoint of the consortium.

The application of the combined Boxer indemnity funds to some such program under the direction of a foreign inspector-general would do more towards convincing the Chinese of the necessity of such supervision than anything else. It can be done. China is in no position to reject such an offer and the United States, as leader of the consortium, should take the initiative by reconsidering the manner in which she has broken away from her indemnity partners and join with them in a constructive program upon which, to a large extent, will depend the success of the consortium, and our diplomatic prestige in China.

America expects other powers to live up to the joint obligations imposed upon them through the consortium and the four-power and nine-power treaties. In these matters, faithful adherance to the principles involved are calculated to preserve American ideas of what is best for themselves and for China. Other powers are, however, more interested in the material development of China than in her cultural and educational progress. America has broken away from her associates to advance her special cultural interests at their expense. The time has arrived when there should be a coming together on these matters and if America expects cordial and loyal co-operation, there should be some reciprocity, some sacrifice of our ideals for the benefit of our associates. This article shows a practical way out, one that can be applied with advantage to all. At the rate we are going, the present generation will be dead and forgotten by the time the consortium is ready to function. In the meantime, China rots and decays for lack of transportation facilities, while foreign firms are being forced one by one to the wall through China's inability to pay her obligations. Education, sanitation, cultural and spiritual uplift will not solve the problem. Loans to China at this time are out of the question. Colleges will not build railways but railways will build colleges. Let the Boxer indemnity do the work.

G. B. R.

* * *

Why Waste the Boxer Indemnity on Education?

Build Railways and Provide Employment for the Masses

(CONTRIBUTED)

IT is now five years since the consortium was organized to finance China and its attitude remains uncompromising in regard to loan terms. China harbors the delusion that her undeveloped resources conceal the world's last Eldorado and with her credit ruined, dreams of borrowing money for railway construction on the old unrestricted Pukow terms. In the meantime, she is trying to advance along her own lines. Education has made great strides ; the clerical classes are rapidly increasing and the professions are crowded out of all proportion to the demand. There are three government colleges devoted to the education of civil and mechanical engineers, railway traffic officers and employees of other government services. From these institutions graduate at least one hundred engineers annually and a still larger number of embryo traffic officials, all relying upon the government to furnish them employment. In addition, there are the returned American students to be provided for. The government does its best to meet these expectations and the effect of its philanthrophy is well illustrated in the enormous increase in railway personnel since 1916. The following table is illuminating :—

Year	Kilometres worked	Personnel	Trains per day
1916	.. 7,049	59,857	11
1919	.. 7,183	73,651	11
1922	.. 6,279	91,356	12

It is seen that in 1922 with less mileage operated than in 1916 and with only a slight increase in traffic, the number of railway employees has almost doubled. Here we have the logical consequences to the Chinese system of dual control which breeds nepotism of the worst kind and to the weak handling of the bolshevist labor agitation (arising in large part from an over production of college educated employees) which culminated in the disturbances of October 1922. Since the abolition of the old classical examinations in 1904 the student problem has been a nightmare to the Chinese government. The examinations were revived in 1906 but the successful candidates were never employed by the government. Yuan Shih-kai saw in the student class a dangerous political element and found employment for a selected few in order to bind them to his cause. These men have been willing recruits to the various militarist factions which have grasped the reins of government during recent years. The student class throughout the country has developed into an element of unrest, instigators of agitations against foreigners and meddlers in international relations. Their record is one of childish intervention in politics, of college and school strikes and disobedience to their tutors. The government has always temporized before this insubordination and applied local solutions when the problems became acute. Yet in the face of this record the foreign powers now propose, though the use of the Boxer indemnity for educational purposes, to add to the embarrassment of the Chinese government by reinforcing an element already far in excess of national requirements.

To those at all conversant with the condition of the Chinese government services this can only appear as a futile waste of money. The only way to put the Boxer indemnity to useful purposes is to create employment, not only for the technical graduates but for the masses, by allocating the annual interest on the total of the fund to the construction of new railways in accordance with a fixed program supervised by a technical adviser appointed by the powers concerned. According to official returns the Boxer indemnity in January 1920 was apportioned as follows, calculating the French, Italian and Belgian portions at 25 francs to the pound sterling and omitting the minor claimants :—

Great Britain	£11,180,000
France	17,650,000
Italy	5,920,000
Russia	30,760,000
Japan	7,530,000
Belgium	1,870,000
Total	£74,910,000

Deducting Russia's share and disregarding amortization, there remains the annual interest at four per cent. on £44,150,000 to devote to railway construction, or £1,766,000 equivalent to approximately $14,000,000 silver. Unquestionably, the most urgent railway project is the completion of the Canton-Hankow line, upon which depends the unification of North and South and the development of Canton. For similar pacification purposes and the elimination of the Yangtze above the gorges as a highway of trade, the construction of the Hankow-Szechuan railway is next in importance. These two projects should have the first claim on the remitted Boxer indemnity. With 60-lb. rails at the current price of $100 (silver) a ton ; bridges and culvert openings totalling 90 feet per mile and embankments and cuttings averaging ten feet in height or depth, the present day costs of railway construction in China is $75,000 per mile, exclusive of rolling stock, or, $85,000 per mile fully equipped. The heaviest work would increase the cost to $100,000. The annual interest on the total of the Boxer indemnity could therefore construct a minimum of 140 miles of line a year or a maximum of 180.

Such a program would provide employment for thousands of workers, bring incalculable benefit to Chinese and foreign trade and infuse new life into the railway service now suffering from stagnation and overcrowding. The indemnity powers should insist on the faithful execution of the yearly program and extract guarantees that the revenues from the lines so constructed are allocated for new equipment or additional construction. Under such a program

supported by all the interested powers a foreign railway expert could be appointed to supervise the "indemnity" railways who would rank in importance with the inspector-general of customs and the head of the salt gabelle.

It is to be hoped that this vast sum of money will not be wasted at this time on superfluous and unwanted education but expended under some common agreement between the indemnity powers for the creation of public utility works like railways that will confer material benefits on Chinese and foreign trade, provide employment for the host of technical graduates and an army of workers and contribute towards the pacification and unification of the nation by linking the north with the south and the east with the west in bonds of a common understanding. The present system under which each indemnity power seeks to gain some particular advantage through the employment of their portion of the remitted Boxer funds for special purposes only tends to perpetuate international discord by recreating spheres of influence disguised under an altruistic mask. The consortium was organized in order to supplant international competition in the development of China by international co-operation in furnishing the funds, and because of the chaotic conditions and absence of guarantees and security for such loans, nothing has been done to carry out its program. Political spheres of interest were eliminated under the terms of the consortium agreement and made impossible of resurrection by the provisions of the nine-power treaty signed at the Washington conference. Political spheres, however, are being superseded by a more insidious system of peaceful penetration under the guise of philanthrophy. America is silently pushing ahead her plans to dominate the educational and spiritual sphere by spreading her ideals and doctrines amongst a people wholly unfitted to assimilate them, breeding discontent and agitation which in the end will defeat the more practical plans of other nations who entertain no illusions about the capacity of the Asiatic to absorb western ideals.

The success attending the American program has provided the precedent for other powers to protect their interests in China along similar lines and as a consequence we find the British, French and Japanese governments devising plans for the expenditure of their share of the Boxer indemnity that will counteract in part the Americanization of the young Chinese mind. The logical outcome of this tendency will be to partition China into several cultural spheres permeated with ideals so conflicting that pacification and political unification under Chinese standards will become impossible. If the American example is followed by the other powers, international conflict for control of China will be perpetuated, only instead of actual armed strife between the powers, the brunt of the fight will be borne by their spiritual converts and partisans striving to graft their conception of foreign ideals on to the Chinese body-politic. If the Chinese are to work out their own destiny they should be permitted to follow their own conception of ethics, culture and government, in which the west can teach them little that is superior to their own. Herein lies the fallacy and weak point of the American program and if followed by other powers in pursuit of their own special ends, can only retard the political development of this country and invite a continuation of the unrest into which the country has already been plunged by attempting to digest too rapidly a political salad mixed from the many recipes supposedly adapted to Chinese taste from a confusion of foreign menus.

* * *

America's First Obligation in China

Build the Szechuan Railway

Further Thoughts on the Boxer Indemnity

IN order that Americans may get a common-sense perspective on this much discussed Boxer indemnity question, we must commence by asking ourselves the questions: What are we here for in China? Are we here as traders or are we here as philanthropists? On the proper answer to these questions rests not only the efficacy of our policies and future prospects in this country but the right to ask other powers to co-operate with us in carrying out Far Eastern treaties.

Now we are told by our statesmen, by our orators, by our captains of industry and by our strategists that our chief concern in China is the maintenance of the "open door" doctrine, guaranteeing to Americans the unimpaired right to equal trade opportunity. In every instance where our government has taken a decided stand on Chinese questions it has been in some way connected with our conception of the "open door" principle, and whenever our jingoes and greater-navy advocates seek convincing arguments for the purpose of prying loose an increased appropriation from congress, they invariably harp on the urgent necessity of defending the "open door" doctrine in China. Now it is a fair statement that American trade in this country has grown to its present proportions, not through any particular efforts of our own, but as the direct result of the investment of European capital in the development of its railways and other industries. Americans have done little but talk about what they are going to do some day in the future, at the same time placing obstacles in the way of others doing anything that might in some remote way deprive them of equal opportunity whenever in their judgement the time is opportune to exercise that right.

In our opinion, if the United States has contracted any obligation in China, it consists in a duty to resolve its high principles into some practical program that will contribute towards the further growth of a trade which to date has been made possible largely through the initiative of others. We do not wish to be placed in the position of opposing education or of belittling the meritorious work of our missionaries and educators. They have their own organs and champions who make themselves heard at every opportunity and are able through a perfect organization to bring pressure to bear on Washington which no politican dares to ignore. THE FAR EASTERN REVIEW is here to advance American trade interests, but for the past twenty years we have witnessed the gradual side-tracking of national commercial activities until to-day the principal American business in China is the distribution of charity. The time has arrived when our trade interests are entitled to more consideration. It is the duty of our government to devise some practical program that will enhance our commercial prestige in China through the investment of capital in productive enterprises.

The United States has assumed certain definite development obligations in this country which completely overshadow its humanitarian duties. We received in 1903 a promise from Prince Ching that in the event foreign capital became necessary to build the railway from Hankow into Szechuan, American and British capital would be given the preference. In 1905, the British, French and Belgian groups interested in this concession, pooled their activities and invited the Americans to join. We declined. Four years later when this same combination was ready to sign a contract for the construction of the Hukwang railways, which included the line into Szechuan, we demanded admission into the group and President Taft went so far as to send a friendly ultimatum to the prince regent to obtain participation for American capital.

Again, in 1916, the Siems-Carey Company signed a railway contract with the Chinese government which conflicted with rights previously ceded to other powers and after two years of surveying finally located a line into Szechuan, only to have it protested by the British. The point we desire to emphasize is that Americans are now morally committed to build a railway into Szechuan, an obligation imposed upon us as the outcome of two strenuous diplomatic fights to uphold our conception of the "open door." We forced the door open but never walked through to see what was on the other side. We contend that this obligation transcends in importance any other claim on our finances and we believe that the American government would be wise to take steps to make good its policies through a practical program that will at least equal in part the labors of other nations in developing the resources of China.

It is for this very practical reason that we invite attention to the hokum and buncombe concealed in a program which ignores common sense and violates elementary economics. In this matter of the Boxer indemnity and its contingent features, congress assented to economic principles that if applied by its members to their own affairs would land them in the poor house. We would like to hear the classic roar of the watch-dog of the budget when he awakes to the fact that someone slipped over a philanthropic deal on congress which costs the nation twice as much as the amount given away.

Let us see how this works out. We release China from an *irrevocable* penalty imposed upon her for the murders, violations, outrages and other indignities inflicted upon our nationals in 1900 and hypnotize ourselves into the belief that we are in some sort of fashion, saviors of China. We invite the other treaty powers to a good, old-fashioned Methodist revival meeting at Washington and

Engineering and Industrial Notes

BRIDGES

AMERICANS BUILD TOKYO BRIDGES.—Three American engineers will have charge of the construction of two large bridges which are to be erected across the Sumida river by the reconstruction bureau. The engineers are being selected now by the Foundation Company of New York. By applying American methods in the construction of the two bridges, the reconstruction bureau expects to avoid the long delays which occurred in the building of the Shino bridge across the Sumida several years ago. Five years were required in which to complete this work. The Eitai and Kiyosu bridges, the two now to be constructed, are to rest on foundations sunk in the river bed by compressed air.

NEW BRIDGE FOR TIENTSIN.—The Haiho conservancy board has accepted the tender of the Etablissements Dade and Schneider, who are represented by Oliver & Co., in China, for the new international bridge at Tientsin. The bridge, which will form a continuation of the Rue de France, is to be of the Scherzer rolling lift type. The cost of the bridge is divided up into Gold $251,354 and French Francs 2,918,400, making a total of approximately Tls. 549,950. The caissons are expected to arrive in February 1925 and the bridge will be completed in February 1927. It will be supervised by the contractor's engineer and the conservancy commission will probably appoint an engineer to watch the construction of the bridge in their own interests. The bridge is to have two sets of piers on the bed of the river. The abutments will be 306-ft. apart, the facing of each resting on the normal line on either side. Neither of the two sets of piers must reduce the width of the river by more than twelve (12) feet on the site. The bridge will, therefore, consist of three spans. The mobile span will be such that when the bridge is open vessels will have a free fairway of 140-ft. and the structure will be so designed that there shall be no danger of its being fouled by passing steamers.

NEW HONGKONG BRIDGES.—Notification has appeared in the *Hongkong Government Gazette* calling for tenders in connection with the widening of eleven bridges in the new territories. This action was taken following a fatal motor bus smash when the jury, finding the men guilty of manslaughter, added a rider to their verdict, that they considered that all bridges in the new territories should be made the width of the roads they span.

NEW OVERBRIDGE FOR SSUPINGKAI.—The S.M.R. Co. is planning to build an overbridge over the railway tracks at Ssupingkai station to take the place of the level crossing. The new overbridge will be constructed in the next fiscal year at a cost of Y.400,000, and will be built on such a slight curve as to be practicable for loaded carts.

TSIN-PU RAILWAY BRIDGE.—The Tientsin-Pukow railway administration is reported to have imposed a tax of two copper cents on each passenger ticket, to raise funds for repairing the railway bridge across the Yellow River at Lokou. As the insurance on the bridge in question will expire next October, the department of communications will detail Mr. Chai Chao-lin to Tsinan to inspect the bridge structure and take steps for repair.

TUMEN RIVER BRIDGE.—The question of bridging the Tumen River has been pending between China and Japan for the past several years, but the Chinese feared that the bridge would enable the Tienpaoshan-Tumen railway to be connected with the Korean railway, as a military measure, refused to permit the work. Now that a section of the Tienpaoshan-Tumen line has been built, the Japanese consul-general at Chientao again has approached the *taoyin* of Yen-chi district for the solution of the question and the commissioner of foreign affairs at Mukden has agreed to the plan. The bridge will be built under the joint enterprise of China and Japan, the portion of expense to be shared by China being defrayed out of the royalty to be paid by the Tien-Tu railway. The commissioner of foreign affairs at Mukden has been appointed chief of the Chinese officials superintending the bridge construction.

COTTON MILLS

SPINNING MILL AT CHINCHOU.—The construction of the new Chinchou spinning mill of the Naigai Raw Cotton and Spinning Co., Ltd., has made good headway. The first installation of machinery arrived in April, on the completion of the mill buildings and the second installation was finished early in May. The new plant soon will be opened with 20,000 spindles in operation.

ELECTRICAL

HANKOW WATERWORKS WANTS TRANSFORMERS.—The Hankow Waterworks and Electric Light Co., Ltd., is calling for tenders for nine 1,000 k.v.a. transformers (2,300-6,000 volts), together with extra high-tension and low-tension switchgear and other gear necessary for the equipment of two transformer stations. Specifications and forms may be obtained from the head office of the company, Taiping Road, Hankow, at a cost of $10.00, silver. Sums paid for copies of specifications up to three will be refunded on receipt of a *bonâ-fide* tender. These tenders, submitted in duplicate and marked "Tender for transformers, etc.," must be declared at the company's head office by not later than noon of September 30.

MACHINERY

CRANES FOR JAPAN.—Export contracts have been placed in America for seven large cranes for shipment to Japan. An industrial works has received an order for four cranes of which two are for the railroads in Japan and two for the reconstruction bureau of the Japanese government. Another American manufacturer has just closed contracts for three large cranes for the Japanese reconstruction bureau.

DRYING MACHINERY IN JAVA.—Drying machinery for coffee is a subject which is commanding great attention at present among estate owners and machinery importers in Java, according to Vice-Consul Rollin R. Winslow, of Soeraboya, Java. The first types used were similar to the American hot-air furnace, but this system, however, has recently been supplanted by a central water heating system of a patented Dutch design that furnishes hot water to a series of radiators in the outlying drying houses. There is much room for improvement in the method of drying coffee and rubber, and any new system which would lessen the time required for drying would probably meet with success in East Java. Until a new system is introduced, it is believed locally that the hot-water system of central heating with radiators, etc., will be the most popular one in Java markets. Many of the estates which had the hot-air systems have supplanted them with central heating plants.

MINES

ANSHAN & PENCHIHU STEEL WORKS.—Mr. K. Takemura, councillor of the S.M.R. Co., reports that the new expansion program of the Anzan Iron & Steel Works has been well started and that the Penchihu iron and steel works is now turning out about 40,000 tons of pig iron a year by use of one of the blast furnaces.

The rich ore of Penchihu will be exhausted in seven or eight years hence. But, an immense quantity of low-grade ore is obtainable, which, by a new method of concentration, should vastly prolong the life of the mines.

CHINESE MINING ENCOURAGED.—The Chinese ministry of agriculture has addressed the following instructions to the provinces for the development of mining products; Where government mines have already been opened, work should be expedited and detailed reports should be submitted to the ministry A complete list of gain and loss and the daily volume of production of all the government mines in the provinces should be submitted the ministry; where government mines have not been operated, work should be started at once. If the provincial government is financially unable to carry on the work, it may start a joint enterprise in conjunction with the local merchants; where work is suspended in case of government mines, a report to that effect should be submitted to the ministry; profits made on government mines should be carefully deposited; the government mining bureaux must consult with the ministry from time to time and directors of government mines should constantly confer with the experts and engineers for better means of production and sale.

COAL RESERVES OF FUSHUN MINES.—Estimates vary widely as to the total coal reserve held by the Fushun Collieries regarded as the richest coalfield in the Orient. Some geologists put the total at 1,000,000,000 tons, which may be assigned to the different shafts and pits as follow:

	Tons
Oyama shaft	130,000,000
Chienchinchai pit	135,000,000
Yangpaipu pit	38,000,000
Togo shaft	70,000,000
Laohutai pit	153,000,000
Wanta pit	163,000,000
Hsintun pit	150,000,000
Lungfeng pit	160,000,000

So far the outputs from the different pits are as follow:

	Tons
Oyama shaft	4,000,000
Chienchinchai pit	9,000,000
Yangpaipu pit	6,000,000
Togo shaft	4,000,000
Laohutai pit	5,000,000
Wanta pit	1,000,000
Hsintun pit...	400,000
Lungfeng pit	900,000
Total	30,300,000

There still remains something like 970,000,000 tons available for mining. Of course, the consideration of mining costs and other factors might prevent part of the vast coal reserve from being mined but even with an eventual output of 7,500,000 tons, according to the present program, coal will be available for 130 years hence.

COAL TRADE OF HONGKONG.—Coal imports—about 82 per cent. of which were bituminous—into Hongkong for the year 1923 amounted to 1,403,491 tons, as compared with 1,048,175 tons in 1922 and 1,175,871 tons in 1921. About 33 per cent. of the bituminous coal comes from Japan, 31 per cent. from Formosa and adjacent islands, and the remainder from North China, Manchuria, South Africa, and Borneo. All of the anthracite coal comes from Indo-China with the exception of about 10 per cent. which is supplied by Great Britain for the use of the British navy. About 25 per cent. of the local coal imports are re-exported to nearby ports for use by small river steamers and launches and by manufacturing plants.

COPPER-MINING IN INDO-CHINA.—Copper-mining concessions for the exploitation of the deposits at Luang-Prabang, Laos, have been granted to the Société des Mines de Cuivre du Haut-Mekong, in order to determine whether the deposits are important enough to mine on a large scale. The société has a capital of 500,000 francs and its head office is at 126 Rue de Provence, Paris.

production is small but the mines show the varied possibilities of the Philippines in natural resources. Folding and faulting make systematic development of the mines difficult and expensive but the geological phenomena helps to make the quality of the coal better than that found in other parts of the islands. He urge caution in development of the mines. Liguan coal is used by Legaspi and Tabaco steamers while Calanaga coal is used by the Manila Railroad company. Elicano also visited the Cebu Portland Cement company's plant and said that test by the bureau of the Cebu cement demonstrate a quality that can be compared favorably, if it is not superior, to imported cement.

RIVERS AND HARBORS

DREDGING SOOCHOW CREEK.—According to two letters received by the Shanghai general chamber of commerce from the Chinese general chamber of commerce, the funds necessary for the conservancy of the lower part of the Soochow creek have been successfully raised through the co-operative efforts of the public organizations of the eight districts concerned and the commercial bodies of Shanghai. It is promised that the work of relieving the congestion will begin immediately.

MIN RIVER DREDGER CONTRACT.—Tfe Min river conservancy board at Foochow, China, has awarded a contract for the suction dredger to a Shanghai firm as agents for a manufacturer in Scotland. In all 20 tenders were submitted, among which were four bids from American firms.

S.M.R. CO. AND THE LIAO RIVER.—The S.M.R. Co. has invested over Y.2,000,000 in conservancy work on the Liao during these 15 years. For the current year, the company has set aside Y.50,000, which is expected to be the last disbursement to be made by the company on this work, for the present.

RAILWAYS

CELEBRATE 10,000th MILE.—At the call of the Japan railway association a celebration of the completion of 10,000 miles of government and private railways will be held on an elaborate scale with Osaka as its centre on October 3, 4 and 5. Among concerns, participating in the celebration are the N.Y.K., O.S.K., T.K.K., Kyoto, Osaka, and Kobe municipal tramways, six Osaka suburban tramway companies, and the Train-making Co., Fujinagata Dockyard, Kawasaki Dockyard, factories in Niigata and the Sumitomo Steel Works. All these are closely connected with the railways and transportation. As expenditure for the celebration Y.200,000 is to be provided, the railway association contributing Y.50,000, and the participators Y.150,000.

DOUBLE GAUGE GOODS WAGONS.—The South Manchuria Railway Company has successfully carried out an experiment with goods wagons adjustable to tracks of different gauges. They are especially designed for use in the proposed through traffic service of the Chinese Eastern Railway and the South Manchuria Railway. Through traffic will be greatly facilitated by the use of these cars avoiding the inconvenience of unloading and reloading at Changchun. The Chinese Eastern Railway has a gauge of 5-ft. and the South Manchuria Railway's gauge is 4-ft., 8½-in.

HEILUNGKIANG RAILWAY AGREEMENT—The Heilungkiang government is reported to have drawn up an agreement with a Russian capitalist for the construction of the Hu-ai railway. According to Chinese newspapers, the following are the contents of the draft agreement:—With the approval of the officers, citizens, merchants and people of Heilungkiang as a whole, the Russian merchant, Hsieh Chieh-ssu (Chinese name of the Russian capitalist) shall advance the construction of the Hu-Ai railway which shall start from the Sungari town of Hulun on the north bank of the Sungari River and end at Aikiang *hsien* via Hulun, Suihua, Hailun and Wangkuei. The line is 840 *li* long.

Hsieh Chieh-ssu shall be responsible for building the whole line, purchasing lands along the line and building stations, offices for selling tickets, and godowns and for all other expenses. Beginning from the date of the assumption of train services, Hsieh Chieh-ssu shall be permitted to be the manager of the line for eighteen years after which the line shall be unconditionally returned to China. The annually profits of the line shall be divided between China and Hsieh Chieh-ssu at the rate of 30 per cent. and 70 per cent. respectively.

China shall appoint the assistant director, and station masters of all the stations and have the right to audit the accounts of the line. The right of protecting the line shall belong to the Chinese troops along the railroad to be freely detailed and recalled by China. The line shall supply them with expenses and ammunition. Within two months of the signing of this agreement, construction work shall begin, otherwise the agreement shall lapse.

LEVELLING S.M. RAILWAY.—The work of lowering the level of railway track about Liaoyang has now been under way two months, contracts for the work having been awarded to several Japanese firms. In view of the approach of the rainy season, the work will be pushed forward with utmost dispatch. The entire work, including materials, is estimated to cost about Y.300,000. The work includes a bridge over the Lingkungting, a new concrete culvert, with embankments and retaining works.

NEW DAIREN STATION BUILDINGS—The new Dairen station buildings are to have 2,000 *tsubo* in total floor space, and are to be built at the west of Nippon bridge. The construction work will extend over three years, and will cost about Y.2,500,000. For the current fiscal year, Y.100,000 is set aside for the foundation work, most of which is to be finished within this year. The Nippon bridge, which is only 15.5 metres wide, is to be broadened by 10.5 metres on the western side. The tramway will be double-tracked.

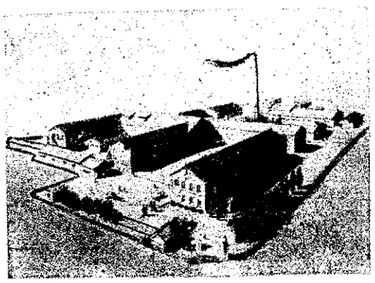
NIPPONOPHONE CO., LTD.

And Subsidiary Companies

Head Office: TOKYO.

Principal Factory at Kawasaki; Subsidiary Factories at Kyoto, Osaka, Yokohama, Osaki, and Tokyo, JAPAN

Manufacturers of PHONOGRAPH Machines and Records
FIFTEEN YEARS EXPERIENCE



EUROPEAN as well as JAPANESE, CHINESE, KOREAN, and FORMOSAN MUSIC is reproduced by our Records.

Excellent Machines and Records at Comparatively low prices.

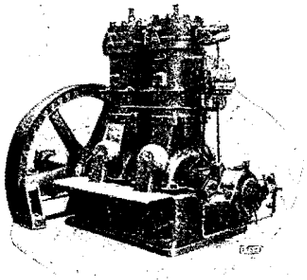
Look for The EAGLE Trade-mark on the Records as well as on Machines.

Write to EXPORT DEPT.: Meikai Bldg., Akashi-machi, KOBE

SULZER BROTHERS

SHANGHAI ENGINEERING OFFICE
No. 4 AVE. EDWARD VII

蘇爾壽工程事務所 上海愛多亞路四號



Airless Injection Two Cycle Sulzer Diesel Engines

目錄及關於工業上之問答等請直接本公司

Uniflow Steam Engines, Upright Watertube Boilers, High and Lowlift Centrifugal Pumps, Fans and Ventilators for all purposes, Fire Engines, STATIONARY DIESEL ENGINES, Direct Reversible Diesel Marine Engines, Ice and Refrigerating Plants, Electro-Boilers, Maag Gears and Maag Gear Planing Machines.

WINTERTHUR, SWITZERLAND.

大正七年七月十日第三種郵便物認可

Jap. Ship Stab Cars p 405

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

WHY NATIONS FIGHT

P. CHIERI 23/IX 1924

A BIG AMERICAN BELITTLED

MORE OIL.—THAT SECRET RUSSO-JAPANESE TREATY

JAPAN-CHINA COTTON MILLS AT SHANGHAI

VENEER INDUSTRY OF JAPAN

BRITISH EMPIRE EXHIBITION

SINGAPORE WATER SUPPLY

JAPAN'S HIGH VOLTAGE TRANSMISSION SYSTEM

TIN MINING IN F.M.S.

Vol. XX August, 1924 No. 8

SHANGHAI, PEKING, TOKYO AND MANILA

A.L. TAYLER

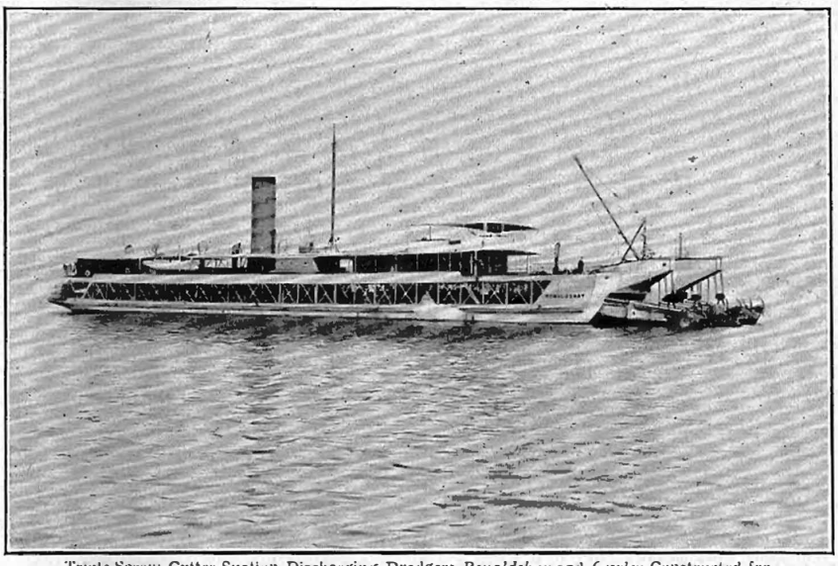
Wm. Simons & Co., Ltd., Renfrew

CONSTRUCTORS OF

Marine Dredging Plant

of most Modern and Improved Types and of the Greatest Capacities.

Constructors of Barge Loading, "Simons" Reclamation, Canal and Suction Cutter Hopper Dredgers. Hopper and Barge Loading Bucket Dredgers. Alluvial Dredgers. Trailing Suction Dredgers.



Triple Screw Cutter Suction Discharging Dredgers *Ronaldshay* and *Cowley* Constructed for the Government of India.

Propelling and Dumb Hopper Barges.

Replace Parts supplied or fitted to existing Dredgers.

Inventors and First Constructors of "Hopper" and "Sternwell" Dredgers and Elevating Deck Ferry Steamers.

Telegrams: "Simons" Renfrew.

Established 1810

Head Office and Works: Renfrew, near Glasgow.

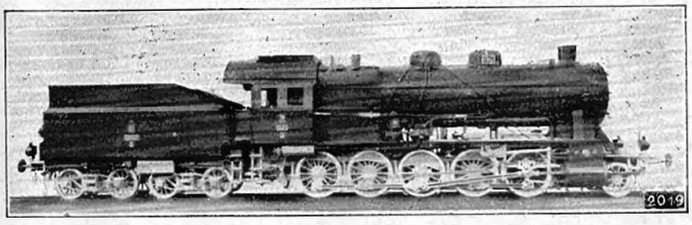
8a Yuen-Ming-Yuen Road Shanghai.

Agents in China: THE JARDINE ENGINEERING CORPORATION, LTD.

and at Hongkong, Tientsin, Hankow, Peking, etc.

BERLINER MASCHINENBAU-A.-G. vormals L. Schwartzkopff

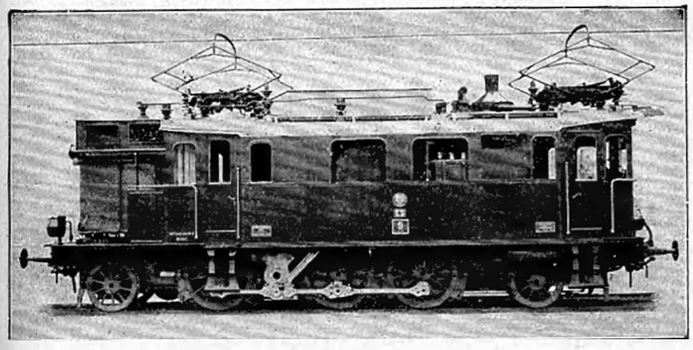
BERLIN N. 4, CHAUSSEESTRASSE 23



LOCOMOTIVES

OF EVERY SIZE AND FOR EVERY GAUGE

Superheated Steam Locomotives, Electric Locomotives, Complete Installations for Haulage by Compressed Air Locomotives.



AN ECONOMICAL OIL ENGINE

Figured on a basis of first cost, including interest and depreciation, fuel, attendance and all other power plant expenses, the "Y" Oil Engine produces power at a lower cost than any other type of engine.

With every "Y" Engine you get Fairbanks-Morse quality—the assurance of lasting engine satisfaction.

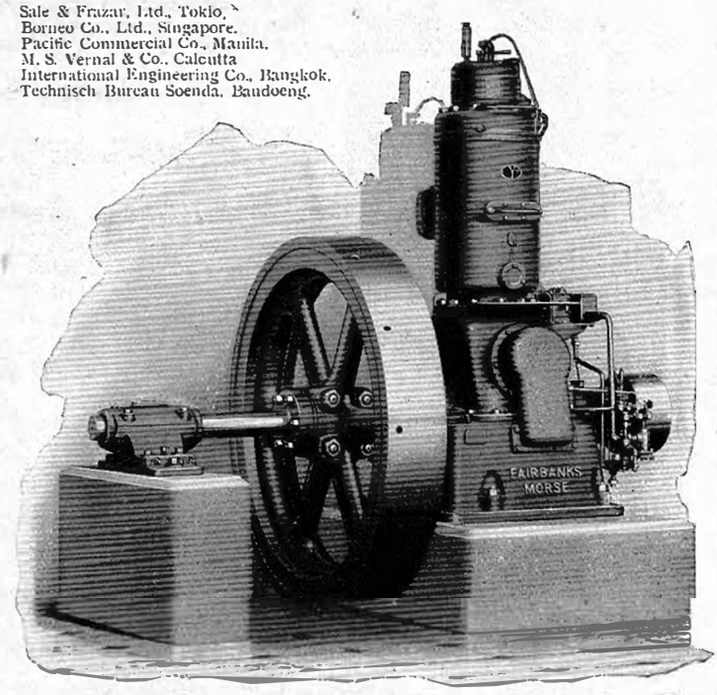
Manufacturers

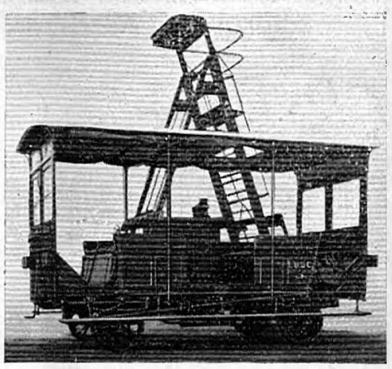
Fairbanks, Morse & Co. INCORPORATED MANUFACTURERS

Export Dept., 30 Church Street, New York, U.S.A.

Far Eastern Agents:

Sale & Frazar, Ltd., Tokio,
Borneo Co., Ltd., Singapore.
Pacific Commercial Co., Manila.
M. S. Vernal & Co., Calcutta
International Engineering Co., Bangkok.
Technisch Bureau Soenda, Bandoeng.





Engineer's Car fitted with Telescopic Ladder for repairing overhead electric equipment.

INTERNAL COMBUSTION LOCOMOTIVES

ALL THE WORLD OVER BY

RAILWAY MOTOR CARS

THE DREWRY CAR Co., Ltd.

COACHES

AND

McEWAN PRATT & CO., LTD.

River Plate House, South Place, London, E.C.2.

TRAMCARS

Works: BURTON-ON-TRENT, ENGLAND

Telegrams: "EFFERVESCE LONDON"

ETC.

Contractors to the Admiralty, The War Office, India Office, Crown Agents for the Colonies.

To Reach the

FAR EASTERN MOTORIST ADVERTISE

IN

ASIATIC MOTOR

Official Organ for

The Automobile Club of China
Hongkong Automobile Association
North China Automobile Club

Head Office: 16 Jinkee Road, Shanghai, China.

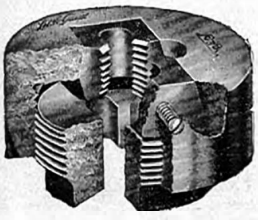
Coal-Tar-Products such as destilled and prepared tar Pitch, Creosote Oil, Carbolineum, Naphtalin, Carbolic Acid, are offered for supply from own production (yearly production about 25,000 tons).

Asphaltfabrik Rudow,

DR. ING. WILHELM SCHLIEMANN,

Aktiengesellschaft

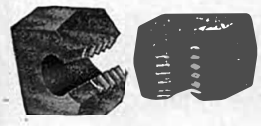
Kanalstrasse, Berlin—Rudow



Collet Complete

Cap

Guide



"Little Giant" Die

Little Giant Screw Plates

For 40 years "*Little Giant*" Screwing Tackle has been known and sold all over the world. "*Little Giant*" is the sign of quality wherever screw plates are used.

We manufacture hundreds of different assortments to fit every need. Cutting sizes range from 1/16 inch to 1 1/2 inch. We furnish Whitworth or United States Standard threads as may be desired.

For detailed information we respectfully refer you to our representatives, whose names are given below.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS., U.S.A.

London Office: 139 *Queen Victoria St.*

Greenfield Tap & Die Corporation of Canada, Ltd., Galt. Ont.

GTD Screw Plates, Taps, Dies, Reamers, Gages, Pipe Tools, Twist Drills, Milling Cutters

REPRESENTATIVES:

JAPAN.

MULLER, PHIPPS & SELLERS, LTD.
Room No. 758 Marunouchi Building, Tokyo
(Central P. O. Box 98)

MULLER, PHIPPS & SELLERS, LTD.
Dojima Building, Osaka
(Central P. O. Box 63)

HORNE COMPANY LTD.
6-7 Takayama-cho
Kyobashi-Ku
Tokyo, Japan

CHINA.

MULLER & PHIPPS (CHINA) LTD.
5 Ice House St.
P. O. Box 25, Prince's Bldg., Hongkong, China

2 Canton Road
Shanghai, China

Engineering and Industrial Notes

BRIDGES

RAILWAY NEEDS BRIDGES.—Replying to a telegram from Marshal Wu Pei-fu inquiring as to the loss of the government railways due to the floods, it is reported that the ministry of communications has given the figure of $2,400,000 for the Peking-Hankow and Peking-Suiyuan lines. Because of the eighty breaks, and the destruction of five large and two small steel bridges the Peking-Hankow Railway suffered a loss of two million dollars.

BRIDGES ON KIAO-TSI RAILWAY.—The Kiaochow-Tsinan railway administration has concluded agreements with the successful bidder, a German firm, for the construction of a bridge at Lokow, Shantung province, and other bridges along the railway line. Work started August 1.

STEEL BRIDGE ON KIN-HAN LINE.—The ministry of communications has ordered the Peking-Hankow railway administration to invite tenders for a steel bridge to be built at Sinlo, Chihli province, south of the site of the former stone bridge, to replace the temporary wooden bridge. It is to be 60 metres long with eight arches. Its foundation is to be sunk 20 metres below the river bed. The cost of construction is estimated at $1,500,000. After completion, the present steel bridge on the north will be reconstructed so as to form a straight line with the new bridge.

BUILDINGS

YOKOHAMA SPENDING SIXTY MILLIONS.—The Yokohama municipal office has mapped out plans of rehabilitation of the port at an estimate of Y.60,000,000 to be obtained from the Japanese authorities in the form of a long-term loan. In addition, the Yokohama branch of the Tokyo rehabilitation office with Y.50,000,000 will undertake the construction of 21 iron bridges and other works which are of such character as to be carried out by the central authorities. Of the above estimate, Y.3,000,000 each, is allotted for the rehabilitation of a waterworks system and the gas enterprise, Y.8,500,000 for the rehabilitation of electric business, Y.6,188,000 for the widening and repairing of roads, Y.4,179,000 for the adjustment of lands, Y.6,000,000 for the repairing and dredging of rivers and canals, Y.1,250,000 for the construction of sewerage system, Y.3,750,000 for the repairing of the Yokohama memorial hall and Y.1,100,000 for the construction and repairing of parks, of which Y.800,000 will be spent on the reconstruction of the Yokohama park and the balance for enlarging Kamonyama park and creating a new park along the bund at Yamashita-cho which was reclaimed to the extent of some 100 feet in width. The above works will be started early next month.

NEW BUILDINGS IN TOKYO.—A new seven-story office building to be known as Mitsubishi No. 28 is to be erected by the Mitsubishi Company on the site of the wooden barracks from which the Yokohama Specie Bank recently removed. The new building will cost Y.1,000,000 and is to be completed by the end of 1925. The Mitsubishi estate contemplates also the erection of a building with 18,000 *tsubo* floor space, 1,000 more than the Marunouchi building, on the now vacant site directly north of the Marunouchi building and east of the Kaijo building. The plans for this building are, however, still indefinite.

ELECTRIC

SSUPINGKAI ELECTRIC PLANT.—The new electricity works for the Chinese town of Ssupingkai, Manchuria, according to Prefect Yin of Lishu, has its S.Y.120,000 the capital in 1,000 shares of S.Y.120 each, paid up. About two-thirds of the machinery has been received, and the construction of both power house and office is to be started at the end of this month. Two cooling water wells are under excavation. The subscriptions to the lighting service have exceeded 2,400 lamps, and are expected to reach 3,000 lamps soon. The machinery is furnished by the Siemens China Co., and the daily consumption of coal for fuel is about 1 ton.

Mr. Wu Pei-shan, manager of the branch of the bank of communications in the new town, a graduate of the electrical engineering course of the Tokyo Technical University College, drew the design for the new works.

LIAOYANG-MUKDEN POWER LINE.—Tests of the new line for transmission of power from Mukden to Liaoyang, are finished and the line stood up under trial transmission of current of 55,000 volts. The switch-boards indoors and the transformers installed outdoors were subjected to high pressure tests. To begin with, 1,000 kilowatts are to be supplied to the Manchuria Spinning Mill, Liaoyang, until October, also 150 kilowatts to the railway repairing shops. At present, 14,110 lamps are installed at Liaoyang. The existing power station is to be held as a reserve for the time being.

SINGAPORE POWER PLANT.—The Singapore municipality has purchased land in the neighborhood of St. James' Walk for the construction of the new municipal electrical power station. The amount paid to the owners, Mr. S. Q. Wong and others, is said to have been nearly one million dollars.

SSUPINGKAI ELECTRIC WORKS.—The installation of an additional generator at the Ssupingkai Electric Light Co., which has been delayed owing to the destruction of the Shibaura plant, Tokyo, in the earthquake, will be made at the end of August.

AMANOGAWA POWER HOUSE.—In order to supply power to the new spinning mills, nearing completion at Choushuitzu north to Dairen station, and Chinchou, a new turbine of 5,000 kilowatts has been installed at the S.M.R. Co. Power House, No. 2, in Amanogawa, Shakako. The work was begun in April. The power house now is generating 10,000 kilowatts.

ELECTRIFY KUSATSU RAILWAY.—Electrification of the present fifteen miles of track laid, and its extension as far as Kusatsu, the spa at the foot of Shiranesan, is the plan of the Kusatsu Tetsudo Company which now operates a light railway from Karuizawa station to Tsumakoi, some twelve miles. This light railway was put into operation in 1914. The company's capitalization has been increased to Y.2,000,000, to carry out the electrification and extension of the line.

S. M. R. ELECTRIFICATION.—The S. M. R. Co., has completed its plan to electrify the trains operated on Dairen wharves and on the Fushun branch line, to economise in operating costs, and to turn to good account what is called coal shale or rubbish.

The Company intends to set apart an appropriation of Y.37,000,000 for the construction of electric locomotives, to be undertaken over 2 years from 1925.

Under the existing steam system, on the Dairen wharves, the annual total costs are Y.485,000 as against Y.408,000 for the electric trains per annum.

As to the Fushun branch line, in addition to economizing the expenses, the following advantages will be secured:

Coal shale and other by-products may be utilized. Communications between Fushun, where power is generated, and Mukden, whereto power is supplied by Fushun, will be materially improved. It has been found that the readiest way to utilize non-saleable coal shale, is by low temperature dry distillation, to convert it into power gas for operating trains and valuable by-products such as sulphate of ammonia and coal tar derivatives.

INDUSTRIAL

ABATTOIR FOR SEMARANG, N.E.I.—The Semarang municipality has been authorized to float a loan of 1,100,000 guilders (the guilder = $0.40), which, when realized, will be appropriated as follows: Construction of abattoir, 830,000 guilders; general building, 200,000 guilders; laying of water mains, 50,000 guilders; and miscellaneous, 30,000 guilders. (Trade Commissioner Jesse F. Van Wickel, Batavia, Java.)

EXTEND P. I. SUGAR CENTRALS.—All mechanical improvements, looking toward greater sugar production by the Philippine National Bank centrals in Negros, the Philippines' greatest producing centre, are provided for in contracts for new machinery and equipment, awarded to various Manila firms during the last few weeks, details of which were made public recently. New mill additions will be constructed. More transportation equipment will be added. Better electrical equipment has been provided. More than P.3,500,000 will be expended on the additions.

The Earnshaw Docks and Honolulu Iron Works have been given the contract for the extension to the Ma-ao Sugar Centrals company. This includes a new mill, vacuum pans, centrifugals, and general equipment.

The Catton-Neill Engineering and Machinery Company has been awarded the contracts for the centrifugals, pumps and electrical equipment for Isabela and Ma-ao centrals. The Catton-Neill Company is also furnishing the new boilers. Additional installation of equipment at Talisay is being built by the Earnshaw Docks and Honolulu Iron Works Company. This company was the original builder of the Talisay plant. The additional equipment will bring the plant to capacity in all departments. Approximately 2,000 additional daily tons of transportation equipment, including cars and locomotives, is being purchased from the Koppel Company and the Pacific Commercial Company.

Two large warehouses are to be installed soon at Pulupandan and Hinigaran. Contracts have not yet been awarded. Fifteen hundred feet of wharf is to be extended to the present Bacolod and Talisay wharf. This will give greater loading capacity with ships enabled to go up to the dock for bags of sugar at low tide and during the entire day. At present, loading is handicapped.

HAIPHONG GLASS FACTORY.—French firms now are pursuing the policy of setting up factories abroad and one of the latest arrangements of this kind has been made by a number of glass manufacturers. The Société de Terreries d'Extreme-Orient is an association representing the Société de Saint-Gobain, the Société de Glaces Nationales Belges, the Société Financiere et Coloniale, the Distilleries Indo-Chinoises, and the Société de Chimie d'Extreme-Orient. This organization contemplates doubling its capital of 5,000,000 f., and as a means of keeping a hold on the Far Eastern market, will supply buyers there with goods from factories at Haiphong, Tonkin.

DAIREN'S PLATE GLASS FACTORY.—The erection of the new plate glass factory by the S. M. R. Co. ceramic experimental institute at Dairen, is making fair headway. The warehouse has already been completed. In about a month or so, the office and auxiliary buildings will also be finished. The machinery, Flinck system, has been imported from America, and the new factory is expected to be ready to put out plate glass from about January next. Late in August, Mr. Flinck investor of the Flinck system, is also expected at Dairen. Necessary gas service will be available at short notice. Two American engineers will aid in

getting the glass works into running order and the output of the new factory is expected to be equal to that of any other country. Advance orders have been received from Shanghai, Tientsin, Harbin, and the South.

CHINCHOU MATCH-STICK FACTORY.—A new match-stick factory is being erected on a tract of land adjoining Chinchou station an hour from Dairen by rail. The first factory has five machines and work will be begun by operating three of them to a capacity of 25 carloads of match-sticks a month. This first plant is an experiment, and should the results be satisfactory, the scale of manufacture will be greatly enlarged. The promoters are Kobe capitalists.

PLAN FUSEL OIL PLANTS.—Methods for the recovery of fusel oil, chemically known as amyl alcohol, in the alcohol-distillation industry of the Philippines, have recently been developed by the bureau of science at low cost and it is expected that considerable expenditures for the necessary plant soon will be made. Fusel oil recovery is a new enterprise for the islands, although it has existed in other countries for some time, it was said. Fusel oil is a very useful and versatile substance and, because only a few tenths of one per cent. of the main product, alcohol are recovered, it is in great demand. The most important use is as a solvent for nitrocellulose in the manufacture of celluloid. It also is the starting point in the preparation of several artificial or "synthetic" perfumes and flavors, and in the manufacturs of patent leather for shoes. Large quantities are used in paints, varnishes, and lacquers, for special purposes such as the protection of metals from corrosion where a non-metallic coating is desired.

JAPAN'S AIRPLANE WORKS.—At present planes, motors, and accessories are made in one of the departments of the Kure naval munition factory, but in view of the enormous amount of work entailed by aerial preparedness, the authorities have decided to separate the plant, and erect an independent factory at Hiroshima, to employ 10,000 workers solely for manufacturing aeroplanes and parts thereof.

AIRPLANE FACTORY IN MANCHURIA.—The new airplane factory under management of a French expert, outside west gate, Mukden, is now being equipped. Airplane accessories beyond the scope of the new factory are to be imported direct from France to be assembled at Mukden. At present, one machine under re-erection. Marshal Chang Tso-lin is reported to be taking up manufacture of flying machines extensively though the present factory is on a modest scale and is the first plant of the kind in the three eastern provinces. A new hanger is under construction under east tower, outside east gate. At present, there are said to be over 70 airplanes in all Manchuria, including those that have not yet been assembled.

SHANGHAI SUGAR REFINERY.—The machinery of the China National Sugar Refinery Company, Ltd., a company organized in 1921, is being installed, and operations are expected to be started this autumn. One-fourth of the total capital of $10,000,000 has been paid up. Mr. M. Y. San is president and Mr. C. F. Yien, vice-president. The refinery, which is at Wocsung near the Szetang River, is designed to melt 200 long tons of raw sugar a day. The raw materials will mainly be 96 degree raw sugar of which the largest part will be supplied by mills in Java and Kwangtung province. The machinery, which was ordered in November, 1922, is being supplied by the Grevenbroich Maschinenfabrik of Germany, and an agent of the company has come to China to supervise installation. China now imports from Hk. Tls. 30,000,000 to Hk. Tls. 50,000,000 worth of sugar yearly. The works of this Company will be the largest of the kind in China.

GLASS FACTORY FOR DAIREN.—Plate glass will be manufactured in Dairen by the South Manchuria Railway company in a new factory that will cover 20,000 *tsubo* to be completed glass making machinery is to be ordered from the United States.

NEW SUGAR CENTRAL FOR PHILIPPINES.—A new sugar central is in the process of organization in Capiz with construction expected to be completed in time to take care of next year's crop. M. Inglish, mechanical engineer of Negros, is in charge of the construction of the mill and installation of machinery.

MANUFACTURING

CAMPHOR REFINERY IN HONGKONG.—The camphor refinery belonging to Messrs. A. S. Watson & Co. (Ltd.), which was wrecked by the heavy typhoon on Aug. 18, is now rebuilt. The new plant, when in full operation, will have a capacity of approximately 10 tons of high-grade refined camphor per month. It is the intention to specialise on camphor in tablet form, the tablets to vary from one-eighth of an ounce to 2 ounces in weight, and the camphor will have a purity of from 99 to 99.5 per cent.

NEW PARAFFIN FACTORY FOR FUSHUN COLLIERIES.—An appropriation of Y.123,000 has been set apart in the estimates of the S.M.R. Co. for establishing a paraffin factory at the Fushun Collieries. The collieries have been carrying on the dry distillation of tar residues for obtaining heavy oil, gas. The new scheme above mentioned is to supply the company's own wants in paraffine, which have hitherto been procured from Japan.

JAPANESE CEMENT FOR JAVA.—The Onoda Cement Factory, Choushuitzu, now supplying 700,000 barrels of cement a year, has opened a business relation with Java through the Mitsui Bussan Kaisha and many thousands of barrels of Onoda cement already have been shipped. The cement is intended for road-building and construction of sugar refineries, etc., in Java.

RADIO

WIRELESS STATIONS FOR CHOSEN AND TAIWAN.—Chosen and other overseas possessions are still so poorly equipped with means of telegraphic communication, that the Japanese communications authorities have decided to construct two big powerful wireless stations solely devoted to communication with Chosen and Taiwan colonies, and have already started work on them. By the time they are completed, Chosen is expected to be in a position fully to carry on communication with the homeland through them. The wireless station at Ryuzan, however, is too old and too poorly equipped to serve such purpose. In view of this, the communications bureau in Chosen is considering measures to improve radio facilities. An official of the bureau has stated that the projected wireless stations, one at Kemigawa, Chiba prefecture, and the other at Iwatsuki, Saitama prefecture, now under construction, will be linked up with Chosen by a new Ryuzan station, estimated to cost Y.500,000 When the project is carried into effect, he says, it will be easy to handle more than 2,000 messages a day, thus greatly lessening the present congestion in telegraphic communication. To attain this by ordinary telegraphy, it would be necessary to lay new cables connecting Seoul and Tokyo at a cost of Y.1,700,000. In Taiwan it has already been decided to construct a powerful radio station at Keelung at a cost of Y.2,500,000, the example to be followed by Dairen at an early date.

RAILWAYS

SOUTH MANCHURIA RAILWAY ELECTRIFICATION.—A scheme to electrify the whole of south Manchuria is under contemplation by the South Manchuria Railway Company. Engineers investigating the source of the Yalu river have discovered, 100 miles north of Antung, a drop in the river from which, it is estimated, 100,000 kilowatts of electricity can be generated. The intention is not only to supply light, heat and power, including that to electrify the railway itself, but to use the power in the development of agriculture.

JAPAN ELECTRIFICATION WORK STARTS.—The ambitious plans of the imperial government railways of Japan for the substitution of electricity on the Tokaido railway line at the Kobe terminal has been started by the Kobe railway bureau. The entire line will be electrified by the end of 1928, according to present plans. The first phase of the work is the right-of-way between Maihara and Akashi. The second section to be electrified is the road between Maihara and Kyoto. These two sections will be completed by January 1, 1926. During the fiscal year 1924-25 it is planned to electrify the Tokaido from Tokio as far as Kozu, 50 miles to the southwest, and also the branch line to Yokosuka, the naval base on Tokio Bay. American equipment will be largely used in the electrification scheme.

The railway department has been negotiating with private interests for the purchase of a site for a power plant to furnish electricity for this section. When the Tokaido line is electrified the efficiency of the road will be raised 20 per cent., running speed will be greater and the overhead expenses will be reduced by 30 per cent.

TO OPEN LINE TO ATAMI.—Japanese railway experts believe they will be able to open the new railway line from Odawara to Atami next March. The line from there to Mishima, through the Tanna tunnel, will be completed in 1928. Twenty-five thousand six hundred feet or approximately half the length of the Tanna tunnel has been driven. Engineers are being hindered greatly by the seepage of water through rock cracks in the Tanna tunnel, but as soon as this is overcome with cement, the work will be easier and faster, say the expert.

PLAN LINE TO CHENGTU.—A plan is said to be afoot in the civil governor's office and the Szechuan railway and mine bureau for the construction of a railway between Chengtu and Chungking, a distance of about 900 *li*. Capital is to be raised privately among the people of the province. A petition for approval has been forwarded to the effect that authority is given for the construction of the proposed section, prior to which, however, plans in detail must be submitted for endorsement.

NEW TUNNEL SOON OPEN.—A government electric car service between Tokyo and Yokosuka via Ofuna will be inaugurated early next year. As a first step for electrifying the government railway services on the Tokaido and elsewhere, the department of railways has been cutting a tunnel between Ofuna and Hodogaya extending 48 chains which work is expected to be completed in September. The work was started in July, 1922, with Y.1,000,000. The new tunnel, when completed, will be the longest tunnel east of Hakone. Before the earthquake of September 1, the greater portion of the work was completed and not a single fissure was produced in the tunnel by the earthquake. At present, the finishing work such as the construction of arch, etc., is in progress.

KONGOSAN ELECTRIC RAILWAY.—Work on a section of eighteen miles between Tetsugen and Kinkwa on the Kongosan (Diamond Mountain) Electric Railway being finished, the section was opened to traffic on August 1, with rolling stock borrowed from the South Manchuria Railway. Work on the remainder of the 62 miles, connecting Tetsugen and Kwasen, is being steadily pushed on, the section between Tetsugen and Kinkwa, 14 miles long, being already completed. The Shibaura Works in Tokyo is speeding up the construction of the rolling stock for use on the railway but will be unable to complete it before September or October next.

LUNGHAI RAILWAY LOAN.—The *Chen Pao* says that the Lunghai Railway is to resume construction of the section between Sianfu and Lanchow and that a loan agreement has been signed by the ministry of communications and a group of Chinese banks, a Belgian bank participating because it held an option over this section. The loan is for $5,000,000, repayable in 10 years, the issue price 90, interest 8 per cent.,

and the security the revenues of the Lunghai Railway. The group includes the Bank of China at Chincheng and the salt industry at Chungnan.

The actual amount of the loan is Fcs. 75,000,000, which will be issued in Europe by the Banque Belge Pour Etranger to purchasing railway material, and also $10,000,000 to be issued in China to cover the cost of construction. The section of the railway to be constructed first is from Chengchow, Honan, to Sianfu. The agreement represents a modification of the old Belgian agreement of 1912, and the continuation of the line to Lanchowfu will be carried out later, while Dutch interests will complete a short section near Haichow—Extensions to Sianfu, the capital of Shensi.

HARBIN-TAHEIHO LINE.—Permission to build a railway between Harbin and Taheiho, a distance of 140 miles, has been obtained by a Russian named Skidelski, recommended by the *tuchun* of Heilungkiang, from Mr. Ma Chung-chun chief of the railway negotiation bureau, who has been in Harbin for some time past. The concession, which is said to have been signed in secret, reads as follows, according to an authentic source: (1) Mr. Skidelski shall manage the railway for 28 years after construction is complete. Thirty per cent. of the net profits shall be paid to the Heilungkiang government. (2) The railway shall be delivered over to the Chinese authorities at the end of 28 years, without indemnity. (3) The gauge of the proposed railway shall be five feet and one inch, the same as the Chinese Eastern Railway. (4) The capital shall be 20,000,000 yuan.

The Chinese chamber of commerce in Heilungkiang opposes the concession on the ground that while the first and second conditions are favorable to China, the third is contrary to the fundamental policy of the Chinese government to standardize the gauge of Chinese railways, and that all freight will be swallowed by Vladivostok when the Harbin-Taheiho railway is ready. The Chinese also claim that Russian influence will be paramount in Heilungkiang province and that the South Manchuria Railway Company will be affected owing to the difference in gauge. The actual cost of construction is estimated at $1,000,000. Consequently, the Chinese say half the capital and more, is to be spent in secret service money. It is surmised that the funds are to be raised in the United States.

PHILIPPINE R. CO., BUYS KOPPEL CARS.—The Koppel Industrial Car and Equipment Co. have been awarded an order for fifteen 30-ton double truck cane-cars by the Philippine Railway Company, Iloilo. These cars will be used for hauling sugar cane over the company's main lines to the Central Asturias.

CANTON-KOWLUNG RAILWAY.—The Central government has decided that the Canton-Kowlung railroad must be maintained at all costs, according to Peking despatches, and is ready to provide funds to keep it in condition. The ministry of communications, it is said, has asked Mr. Wen Teh-hua, director of the road, to come to Peking. He will be given $50,000 to maintain the road in addition to which the ministry will ask the Shanghai-Nanking line to donate $150,000 more.

JAPAN ELECTRIFIES LINES.—The department of railways is making plans for the electrification of four more lines, the Chuo, Ou, Hokuroku and Jyoetsu. All have numerous tunnels and sharp curves. The Chuo line, between Tokyo and Hachioji, runs more than 50 miles and has 40 tunnes which have impeded the efficiency of it. The electrification would be completed by 1929. Twenty-six miles of the Ou branch would be electrified, between Yonesawa and Fukushima, while on the Hokuroku line, the road between Maibara and Konjyo, a distance of 47 miles, would be improved. It is expected to cut the running time on the Hokuroku line by 40 per cent. Work on the electrification of the Tokaido line is progressing rapidly, the railway department reports. The section between Tokyo and Odawara probably will be completed by next June and the entire electrification by the end of 1929.

TAI-CHI RAILWAY LOAN.—A message is said to have been received in Peking from London approving the proposed contract for a loan by the Peking Syndicate on the Tai-Chi railroad. It is said that the loan contract prohibits the use of any of the funds for other than railroad construction purposes. The total amount of the loan, according to the Chinese papers, will be £1,500,000.

ANHWEI COAL LINE.—The Pu Yi Mining Co., Liehshan, Anhwei province, has petitioned the ministry of communications for the right to build a light railway to transport coal from Liehshan to Fulitsi, a distance of 13 miles, at the company's expense. An increase of capital, amounting to $900,000, is to be used for construction. The proposal is under consideration by the ministry.

TAONAN-KHINGAN RAILWAY.—Fengtien authorities together with the Mongolian princes are said to be planning the construction of a railway from Taonan to somewhere in the Khingan mountains in Eastern Mongolia. The lino is to be known as the Taonan-Khingan Railway for construction of which $6,000,000 has been voted. Funds are to be raised in Fengtien, Kirin and Heilungkiang.

RAILWAY PLANNED NEAR PEKING.—The military authorities of Nanyuan, Peking, are asking the government for permission to construct a railway between Nanyuan and Hwangtsun near the capital. Work will be started as soon as approval is obtained from the ministries concerned.

SOUTH MANCHURIA RAILWAY.—At the 23rd meeting of shareholders of the South Manchuria Railway Co., held on June 21, the total capital of the company was reported to be Y.440,000,000, of which Y.380,000,000 is the present capital and Y.60,000,000 additional subscriptions still to be collected. The net profit for 1923 was Y.34,000,000, and a dividend and bonus amounting to 10 per cent. was declared.

CABLE ROAD UP FUJI.—Tokyo financiers are behind a movement to build a cable car railway up Mt. Fuji. The organization is to be called the Mt. Fuji Climbing Railway Company. It is to be capitalized for Y.1,000,000. Plans are to have the road built from the Yoshida entrance to the eighth station.

The promoters already have applied for permits the applications being on file at the department of home affairs and railways. Both departments have instructed the construction section of Yamanashi prefecture to make a survey of the mountain in connection with the project. A party of engineers, headed by Mr. Yoshida, will make an investigation.

TSOTSUYAO COLLIERY LINE.—The Tsotzuyao Colliery, near Wafangtien, Mr. H. Morita, manager, proposes to enlarge the scale of operation from next October to increase the annual outputs to above 70,000 tons. It is proposed to build a light railway line between the colliery and Wafangtien at a cost of Y.30,000. Some of the light rails between Changchun and Shihpeilin are to be taken over for use by the new line. Two engines and twenty-five ton goods cars, formally run on the Mukden-Antung light rail line, will serve as the initial rolling stock more to be purchased later.

RIVERS AND HARBORS

VLADIVOSTOK HARBOR.—The Ussuri Railway management has been carrying out several plans of improvement on the harbor facilities of Vladivostok since last winter, and now has a bean oil tank of 2,000 tons under construction, to be finished in August. The loading of bean oil into steamers in berth is being effected by means of pipes. The railway plans to construct waterworks, to supply shipping. Berthing sections not deep enough for large steamers, have been dredged, and much reclamation work has been done.

PORT ARTHUR HARBOR IMPROVEMENTS.—In view of the increase in South Manchuria exports in general and Fushun coal in particular, the South Manchuria Railway Company is planning to increase the capacity and shipping facilities of Port Arthur. Bridges, piers and jetties will be constructed. The total cost will be about Y.380,000, and the construction will probably be continued for four years.

SHIPPING

K. Y. K. TO HAVE NEW BOATS.—The Kinkai Yusen Kaisha (Agents N.Y.K.), which was separated from N.Y.K. to develop the coasting service in April last year, has under construction two speedy ice-breakers at Yokohama to shorten the distance between Moji and Tientsin, and to continue winter navigation safety in the Gulf of Pechihli. One of these sister boats the *Nanrei Maru* having been completed, soon will be placed on the Tientsin run and will mark a new era in the traffic facilities in North China. She is over 2,000 tons gross, and develops a speed of 12 knots with a large reserve of power. Having been specially designed for this service, she is provided with electric fans, heating system, wireless apparatus, ice-breaking arrangement and all modern conveniences conducive to the safety and comfort of passengers and crew. The remarkable feature is that she has a 150 tons cold chamber on No. 3 deck so as to be able to carry fresh beef, fish, fruits, vegetables, etc., between Japan and Tientsin.

TO STABILIZE STEAMERS.—The department of railways will install stabilizers in its ferry-steamers between Shimonoseki and Fusan, Chosen. The three boats, the *Keifuku Maru*, the *Tokuju Maru*, and the *Seikei Maru*, advertised as the pride of the department, have become targets of criticism of late for their frequent inability to keep to their schedule. It is said that these boats cannot stand the rough voyage, due to their violent rolling. But with the opportunity offered by the repairing of the *Keifuku Maru* at the Mitsubishi Dock, the department decided to install a stabilizer in consideration of the successful result shown in an experiment on the *Mutsu Maru*, which demonstrated a surprising resistance against storm. The expense of a stabilizer is estimated at about 100,000 yen. This price is very much cheaper than the American stabilizer which costs a half million yen.

SOUTH MANCHURIA RAILROAD STEAMERS.—A plan for building two large passenger steamers to be placed on the regular Dairen-Shanghai service has been drafted by the South Manchuria Railway Company. Two modernly-equipped passenger steamers, each of 4,000 tons, are to be built according to the plan, and negotiations will be opened by the South Manchurian Company with the Mitsubishi shipbuilding yard, in Nagasaki, for the construction. Baron Kinmochi Okura, a director of the railway, has the matter in hand.

THE TAIKOO DOCKYARD AND ENGINEERING CO., LTD., is now building for the Hongkong, Canton and Macao Steamboat Co., Ltd., a big new river steamer to replace the *Heungshan* which struck a rock and was beached in Canton River. The new vessel will cost about $900,000 and will be about the same size and length as the *Lungshan* which was built for the same company at Kowloon Docks in October last. The vessel will be of a different type, especially so far as her engines are concerned, and will be a most up-to-date vessel in every respect. Her builders hope to be able to get from this new vessel a far higher speed than that of any other boat which the company owns. The order was secured by Taikoo in open tender with other firms.

SHU NAN CO., LTD.—The Shu Nan Steamship Navigation Co., Ltd., which has been promoted by Sun Tze-lin and others for the inauguration of another service on the Upper Yangtze, is now being organized. Capital is to be Tls. 50,000. It will have 12 motor boats sailing between Luchow, Kiating, Hsufu, Fushun and Chungking. The boats, which are to be ordered at Kiangnan Dockyard, will

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

CHINA'S FIRST LONG-DISTANCE POWER LINE

NEW YOKOHAMA SPECIE BANK BUILDING

THE PRESSURE OF POPULATION

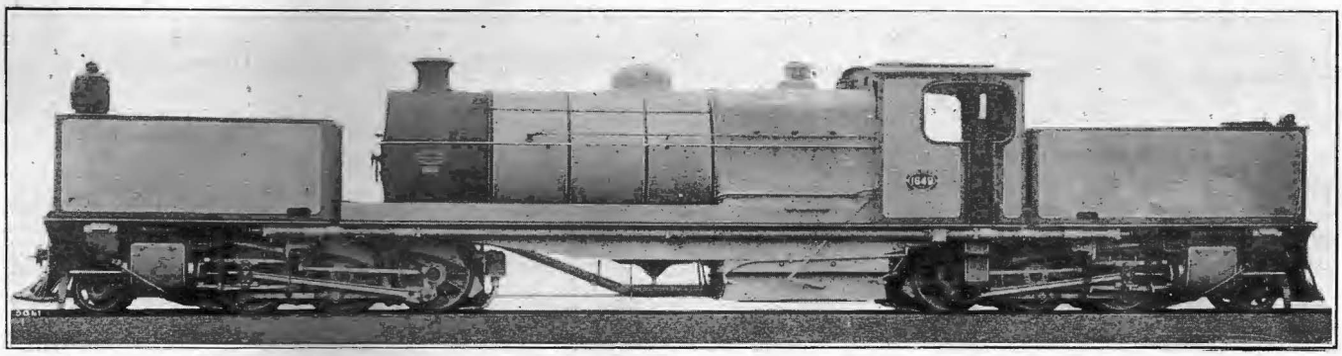
ANGAT RIVER PROJECT

TELEPHONES IN LHASA

CONSERVANCY WORK ON THE YUNG TING HO

Vol. XX | September, 1924 | No. 9

THE GARRATT PATENT LOCOMOTIVE



GIVES—Increased tractive effort on the same weight of rail, maximum power of boiler and low fuel consumption. Economy in operation, only one engine crew necessary with double power.

A perfect running and curving engine, easy on the track.

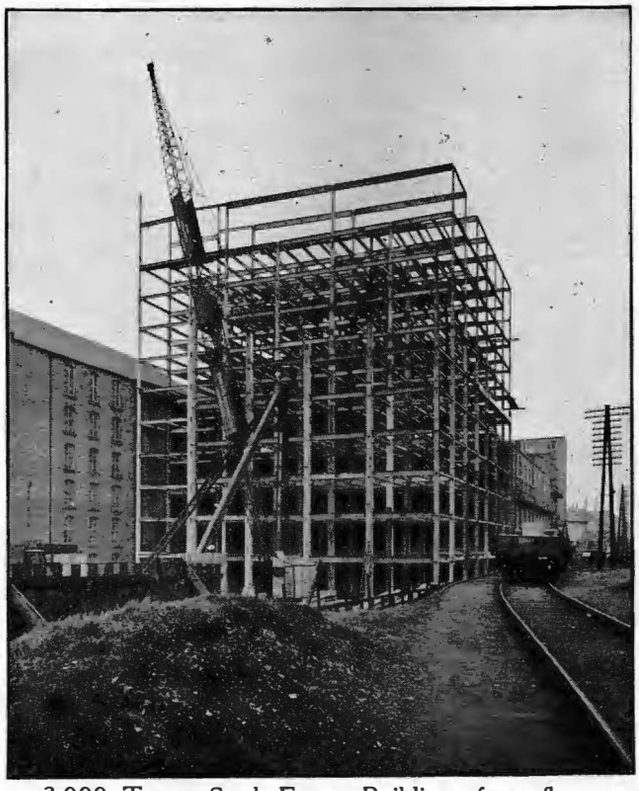
ALL TYPES OF LOCOMOTIVES FOR ALL SERVICES.

Sole Selling Agents in Japan, China and the Far East:

Messrs. Alfred Herbert, Ltd., Osaka

BEYER, PEACOCK & COMPANY, LIMITED

GORTON FOUNDRY, MANCHESTER, ENGLAND



3,000 Tons. Steel Frame Building of ten floors erected in twelve weeks. This type of construction is suitable for all kinds of factories, warehouses, and retail stores. Fire risks reduced to a minimum.

Redpath Brown Steelwork

IN constant demand at home and abroad for all classes of building and structural work—for Factories, Sheds, Warehouses, Bridges, Garages, Godowns, and Pithead Frames. State your requirements and we will supply designs and estimates. Enquiries from architects receive immediate and special attention. With our annual capacity of over 100,000 tons and stocks of steel in hand of 20,000 tons ready for fabrication we are in a position to proceed with the work at shortest notice.

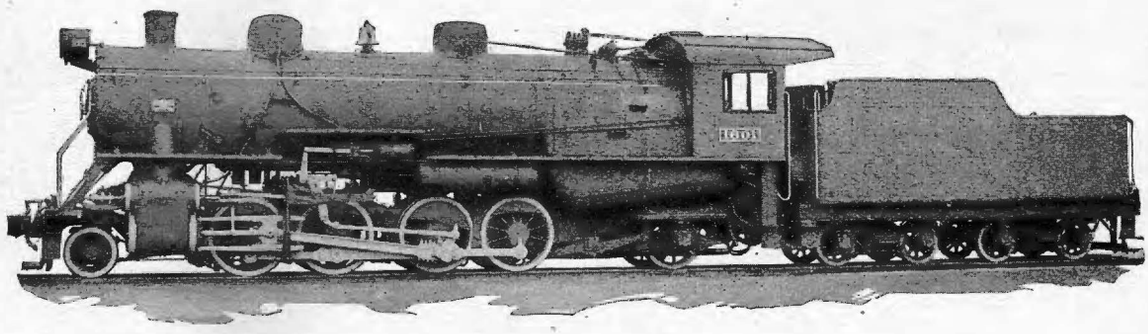
AS Steel Merchants we are also ready to supply from stock, joists, channels, angles, flats, plates, bars, bolts and rivets.

REDPATH, BROWN & CO., LTD.

LONDON: 3, Laurence Pountney Hill, E.C.4.
EDINBURGH (Head Office): 2, St. Andrew Square.
GLASGOW: 19, Waterloo Street.
MANCHESTER: Trafford Park.
NEWCASTLE-ON-TYNE: Milburn House.
BIRMINGHAM: 47, Temple Row.
DUBLIN: 36, St. George's Quay.
BELFAST: 69, Scottish Provident Bldgs.

Cables: A.B.C. Sixth Edition, and Marconi International.

Japanese Representatives: Messrs. L. J. Healing & Co., Eiraku Buildings, Marunouchi, Tokyo.



THREE CYLINDER LOCOMOTIVE BUILT FOR THE SOUTH MANCHURIAN RAILWAY

Weight on Driving Wheels, 194,000 pounds ; Weight of Engine, 263,500 pounds ; Three Cylinders, 22½ × 26 inches ; Diameter of Driving Wheels, 54 inches ; Boiler Pressure, 180 pounds ; Maximum Tractive Power, 56,000 pounds.

THREE CYLINDER LOCOMOTIVE

A more uniform turning movement permitting greater tractive power per pound of weight on drivers.

Reduction in piston thrust due to smaller size of piston used.

Reduction in reciprocating weight per individual cylinder with corresponding reduction in counterbalance and hammer blow on rail.

Increased and steadier draft due to six exhaust impulses instead of four.

Increased tonnage per pound of weight on drivers.

For further information write to our nearest representative:-

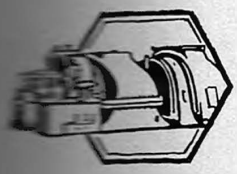
AMERICAN LOCOMOTIVE SALES CORPORATION

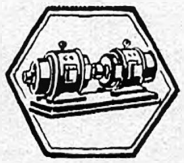
NEW YORK CITY

Telegraphic Addresses:

Locomotive: Peking, China
Mitsui: Tokio, Japan

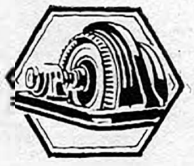
Nottac: Manila, P. I.
Dilpax: Honolulu, Hawaii

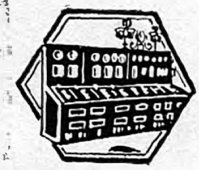
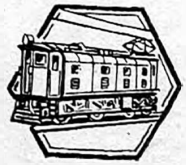




The Mark *of Efficiency*

An Exhibition in Itself—



This exhibit covers a floor area of over 8,000 square feet and comprises in itself a complete Electrical Exhibition.

The "Metrovick" products shown, include every type of apparatus necessary for the Generation, Transmission, Distribution, and Utilisation of Electrical Energy.

If you are interested in anything connected with the Electrical Industry, you will find it here.

Arrange to meet your friends at the "Metrovick" Stand

METROPOLITAN Vickers
ELECTRICAL CO. LTD

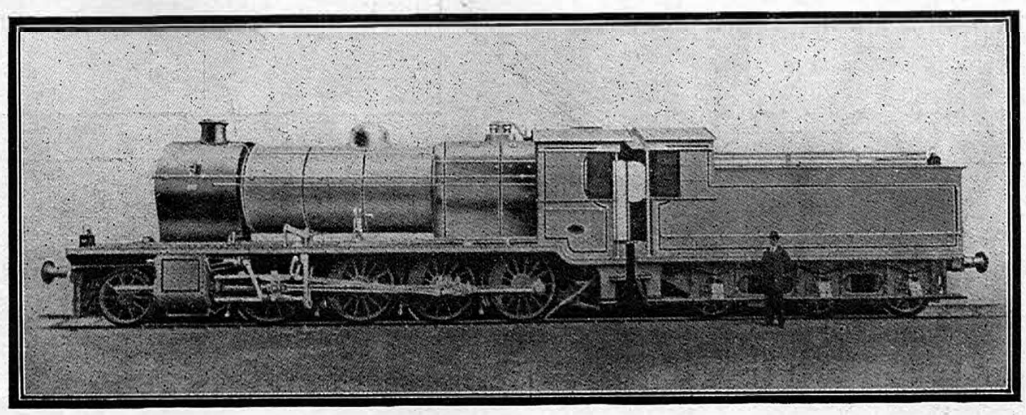
Head Office & Works:
Trafford Park, Manchester.
ENGLAND

A
AZ6

WILLIAM BEARDMORE & CO., LTD.

BUILDERS OF LOCOMOTIVES AND ALL TYPES OF WHEELS AND AXLES

LOCOMOTIVES BUILT FOR GREAT BRITAIN, INDIA, EGYPT, Etc. Etc.



LOCOMOTIVE WORKS: DALMUIR, SCOTLAND

AS SUPPLIED TO EAST INDIAN RAILWAY
2-8-0 CONSOLIDATION TYPE SUPERHEATED

Sole Agents: **BABCOCK AND WILCOX, LIMITED**

HEAD OFFICE IN CHINA:
1 THE BUND, SHANGHAI

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

THE FULL RICE BOWL

PROSTITUTING EXTRATERRITORIALITY

FILIPINO INDEPENDENCE

LABOR'S UTOPIA IN THE PHILIPPINES

HUGE SHALE OIL PLANT

JAPANESE-AMERICAN CO-OPERATION

THE PORT OF SHANGHAI

FAR EASTERN HARBOR IMPROVEMENTS

JAPAN BUILDS MOTORSHIPS

CHINA'S FLOUR MILLS

STRAWBOARD FACTORIES FOR CHINA

MINING PROGRESS IN N.E.I.

Vol. XX October, 1924 No. 10

SHANGHAI, PEKING, TOKYO AND MANILA

上海仁記路第五號

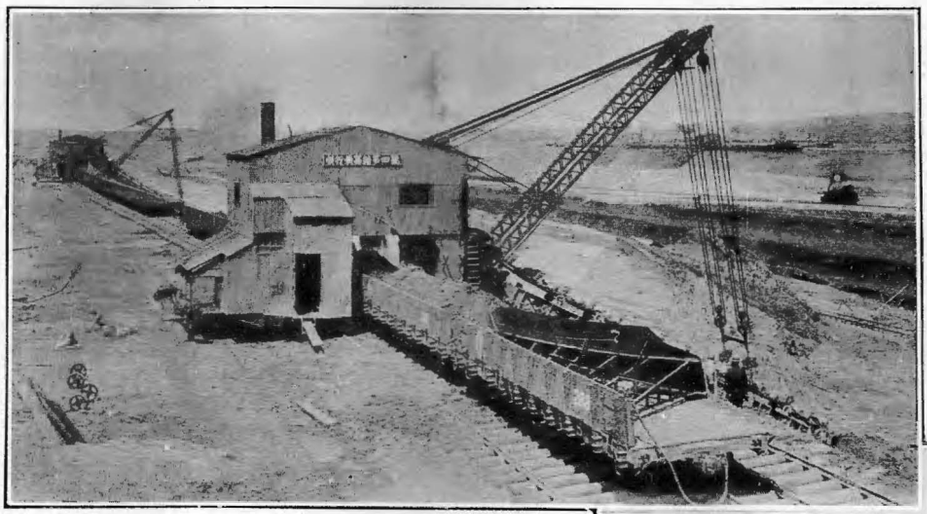
遠東時報

Huge Shale Oil Distillation Plant for Fushun

How Japan will Solve Her Fuel Oil Problem

Manchurian Shales can Supply 1,500,000 Tons of Crude Oil Annually for Two Centuries

WHAT promises to be one of the greatest industrial undertakings of its kind in the world is now on a fair way to be realized by the erection of the initial unit of a huge dry distillation oil shale plant at the Fushun collieries of the South Manchuria Railway Company. The entire coal deposits of Fushun are overlaid with an oil shale stratum that has to be stripped and carted away in order to work the coal seams, so the cost of extracting the shale, being chargeable to the cost of mining, more than offsets any possible disadvantages encountered in working similar deposits in other parts of the world. For the next half century at least, coal mining at Fushun will be confined in the main to working the immense open cast pits where the stripping will be performed by modern excavating machines delivering the shale directly into railway cars to be hauled the short distance of about a mile to a site already marked off for the dry distillation plant next to the new power house on the banks of the river and alongside the railway tracks. There are now three of these excavating machines stripping the new open cast workings and several American steam shovels of the Bucyrus make. The excavators are of German design built in Japan. It is altogether probable that when the oil shale distillation plant is working successfully several more similar excavating machines will have to be employed to furnish the shale.



Fushun Coal Mines: This view shows two of the large steam excavators stripping the shale from the new open cast coal workings at Fushun, delivering the shale direct into railway dump cars.

This view gives a good general view of the shale deposits covering the coal seams in the Fushun open cast workings

The situation at present is that an expert of the S.M.R. is visiting America and Europe inspecting the various oil shale distillation plants in operation in order that the company may decide upon the very best apparatus for erection at Fushun. In view of the fact that the Fushun shale closely resembles that found in Scotland and that the tests on the Fushun shale have been conducted by Scotch experts, in all probability the order for the new Fushun apparatus will be placed in that country. The initial plant, we understand, will handle 700,000 tons of shale per year and will cost about Y.7,000,000. The Fushun shale averages eight per cent. of oil, though some of the samples test out as high as ten per cent. The plant, however, is expected to extract at least seven per cent., thus giving a total annual output of 50,000 tons of crude oil.

If the results from this preliminary plant are satisfactory, it is the intention of the S.M.R. authorities, backed up by the Japanese government, to enlarge it to a point where it is confidently hoped that the Fushun shale deposits will completely free Japan from oil importations from America. The S.M.R. authorities have already drawn up the plans and estimates for an expansion program to extend over a period of five years at a cost of some Y.50,000,000. As there seems every reasonable prospect of this venture being a success from the start, the manufacturers whose apparatus is installed in the initial plant, will have paved the way for a very lucrative business.

For Japan, the success of this Manchurian oil shale distillation enterprise is of more than ordinary commercial interest. Her existing oil fields are nearing exhaustion and she must fall back on Fushun and what she can manage to save out of the wreck of her Siberian adventure through negotiations with the Soviet for the control over certain Saghalien fields. It is not so much a business enterprise of the S.M.R. carried on for their particular profit, as it is of national security and prestige. Like England, during the world war, when the latter country awoke to the fact that she was outdistanced by the United States in the matter of oil fuel supply for her navy, Japan now faces the same problem. The British wasted no time in academic discussion but went to work with a will to develop the shale oil deposits in their own territory and reached out for a larger share in the exploitation of oil deposits in foreign countries. To England alone is due the credit for developing the oil shale industry to a point where it is now commercially profitable and

(Continued on page 488).

Huge Shale Oil Distillation Plant for Fushun

How Japan will Solve Her Fuel Oil Problem

Manchurian Shales can Supply 1,500,000 Tons of Crude Oil Annually for Two Centuries

WHAT promises to be one of the greatest industrial undertakings of its kind in the world is now on a fair way to be realized by the erection of the initial unit of a huge dry distillation oil shale plant at the Fushun collieries of the South Manchuria Railway Company. The entire coal deposits of Fushun are overlaid with an oil shale stratum that has to be stripped and carted away in order to work the coal seams, so the cost of extracting the shale, being chargeable to the cost of mining, more than offsets any possible disadvantages encountered in working similar deposits in other parts of the world. For the next half century at least, coal mining at Fushun will be confined in the main to working the immense open cast pits where the stripping will be performed by modern excavating machines delivering the shale directly into railway cars to be hauled the short distance of about a mile to a site already marked off for the dry distillation plant next to the new power house on the banks of the river and alongside the railway tracks. There are now three of these excavating machines stripping the new open cast workings and several American steam shovels of the Bucyrus make. The excavators are of German design built in Japan. It is altogether probable that when the oil shale distillation plant is working successfully several more similar excavating machines will have to be employed to furnish the shale.

Fushun Coal Mines: This view shows two of the large steam excavators stripping the shale from the new open cast coal workings at Fushun, delivering the shale direct into railway dump cars.

This view gives a good general view of the shale deposits covering the coal seams in the Fushun open cast workings

The situation at present is that an expert of the S.M.R. is visiting America and Europe inspecting the various oil shale distillation plants in operation in order that the company may decide upon the very best apparatus for erection at Fushun. In view of the fact that the Fushun shale closely resembles that found in Scotland and that the tests on the Fushun shale have been conducted by Scotch experts, in all probability the order for the new Fushun apparatus will be placed in that country. The initial plant, we understand, will handle 700,000 tons of shale per year and will cost about Y.7,000,000. The Fushun shale averages eight per cent. of oil, though some of the samples test out as high as ten per cent. The plant, however, is expected to extract at least seven per cent., thus giving a total annual output of 50,000 tons of crude oil.

If the results from this preliminary plant are satisfactory, it is the intention of the S.M.R. authorities, backed up by the Japanese government, to enlarge it to a point where it is confidently hoped that the Fushun shale deposits will completely free Japan from oil importations from America. The S.M.R. authorities have already drawn up the plans and estimates for an expansion program to extend over a period of five years at a cost of some Y.50,000,000. As there seems every reasonable prospect of this venture being a success from the start, the manufacturers whose apparatus is installed in the initial plant, will have paved the way for a very lucrative business.

For Japan, the success of this Manchurian oil shale distillation enterprise is of more than ordinary commercial interest. Her existing oil fields are nearing exhaustion and she must fall back on Fushun and what she can manage to save out of the wreck of her Siberian adventure through negotiations with the Soviet for the control over certain Saghalien fields. It is not so much a business enterprise of the S.M.R. carried on for their particular profit, as it is of national security and prestige. Like England, during the world war, when the latter country awoke to the fact that she was outdistanced by the United States in the matter of oil fuel supply for her navy, Japan now faces the same problem. The British wasted no time in academic discussion but went to work with a will to develop the shale oil deposits in their own territory and reached out for a larger share in the exploitation of oil deposits in foreign countries. To England alone is due the credit for developing the oil shale industry to a point where it is now commercially profitable and

(Continued on page 488).

basin and using the dredged material to reclaim land to be used in connection with a railway terminal to permit the transfer of goods direct between the railway cars and ship's side.

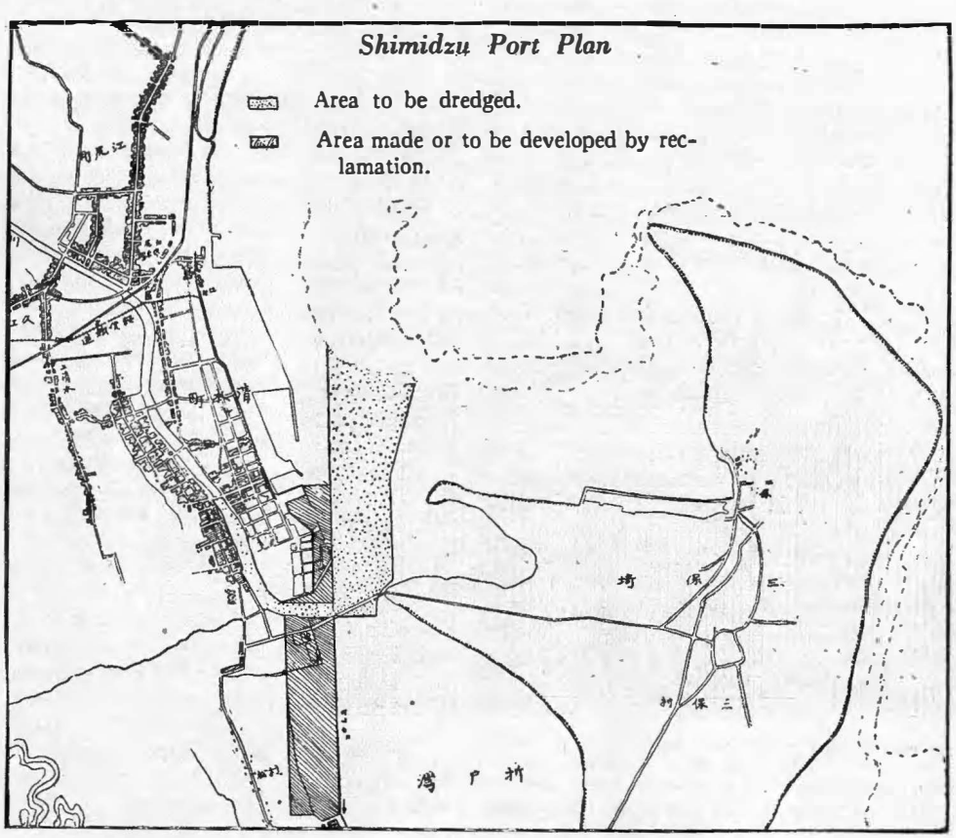
In the accompanying map the area proposed to be dredged is shown by dots, the shaded area representing the land made or at least developed by reclamation. The parts of the deep-water basin adjoining the section of the reclaimed land where it is intended to accommodate ocean-going vessels will vary in depth, 600 feet of the frontage mentioned facing water 35 feet deep, another 600 feet facing 30-foot water and 780 feet facing 24-foot depth, while the remainder of the deep-water basin, extending almost due north from the sections mentioned, will be of 35 feet deep, all these figures having reference to depth at low water. The dotted section of the Tomoegawa River, which cuts in two the reclaimed area, will be dredged to a depth of six feet and will be used as a shelter for fishing craft. The entire dredged area will measure 117,000 *tsubo* (one *tsubo* equals 36 square feet). The reclaimed area will be divided into two sections by the Tomoegawa River, of which that facing deep water will consist of an area of 23,000 *tsubo*, while the reclaimed land south of the stream will measure 90,000 *tsubo*. The former section will be used for terminal facilities, sheds and the like. The latter will be employed partly for railway terminal, while the remainder thereof will be used for industrial purposes and will be given over to private persons or concerns, though whether it will be sold outright or only leased has not as yet been decided. A bridge will be built across the river in order to connect the two sections of reclaimed land, and the railroad which now goes only as far as the sampan basin will be extended to the reclaimed area.

The dredging is being carried out by a bucket dredger and the material placed in scows which convey it to a suction pump by which it is distributed over the reclaimed area. The new improvements will be more than sufficient to handle a traffic of over 300,000 tons annually, or more than sufficient to meet the requirements of the port for some years to come.

Enlarging Kobe Harbor

In our September 1921 number appeared a full official report on the Kobe harbor improvements, since when, the Japanese government has adopted a nine years extension program that will call for an additional Y.62,500,000 expenditure, of which the government will pay Y.32,500,000 and the city of Kobe the balance.

The present extension was provided for in the original port improvement plans and calls for the enlargement of the harbor from 3,000,000 tsubo, its present area, to 5,000,000 *tsubo*. This scheme provides for the extension of the present breakwater, which when completed will consist of five sections aggregating 21,546 feet in length with two main entrances each 990 feet in width and two smaller entrances each 300 feet in width. At present only 7,812 feet of breakwater has been completed representing a cost of Y. 2.670,000. The entire breakwater is estimated to cost Y.15,000,000.



The present harbor extends from Wada point to Wakinihama but the new harbor area will be bounded by Wada point and Shinsaiki. The new extension will add four piers for berthing foreign trading steamers to the present three piers used exclusively for this service. Reclamation work and quays now under construction for the berthing of coastwise steamers will cost Y.9,300,000 of which one-third is being defrayed by the government and the balance by the city of Kobe. In addition, the Kobe authorities are compromised to spend Y.10,000,000 for the construction of railway facilities and the erection of new warehouses on the new quays.

The Hakata Harbor Project

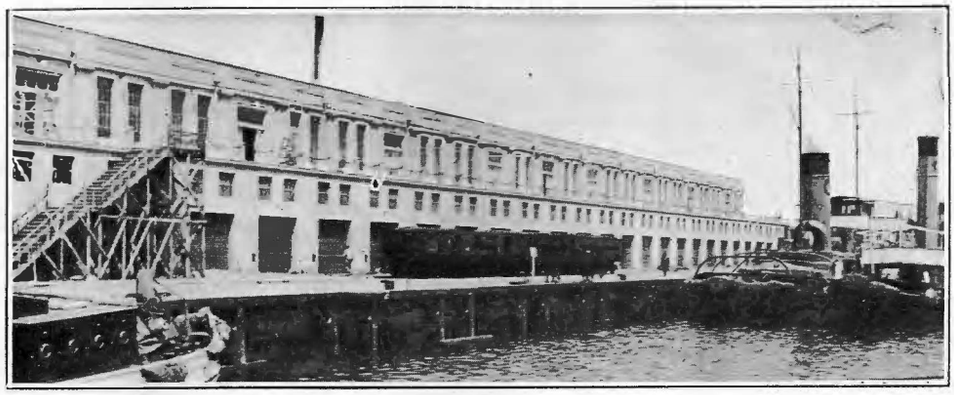
The contract for this work has been given to an American engineering firm of Shanghai, the Asia Development Company, headed by Mr. Paul Page Whitham and expert in river and harbor work. Mr. Whitham is now in the United States in an endeavor to raise the capital for carrying the scheme into execution. A full description of this work will appear in the next issue of THE FAR EASTERN REVIEW.

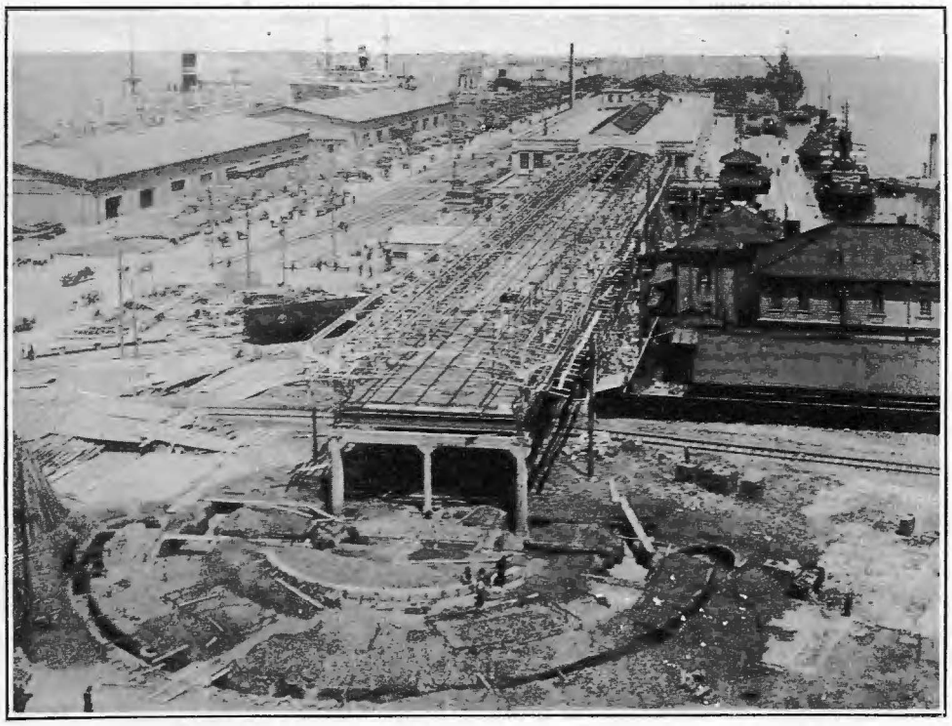
Harbor Improvements in China

In reviewing briefly the many schemes for improving the rivers and harbors of China we confine ourselves to such works as have not already been fully described and illustrated in previous numbers of this magazine. Amongst these are the Chefoo and Chinwangtao harbor works, the ports of Dairen, Tsingtau and Newchwang, the Fitzmaurice scheme for Hongkong and the project for a new harbor for Shanghai. Considerable space might be devoted in describing projects for the minor ports which have small of hope of being carried out under present conditions and considerably more space might be wasted in reviewing the many river and canal conservancy schemes covering nearly every district in China, but as these are all in the embryo stage and with little chance of ever being financed, they resolve themselves for the present into mere projects, many of which are designed and promoted by interested parties in the hope that they may serve as the basis for a foreign loan or be accorded consideration in the distribution of foreign flood and famine relief contributions.

Dairen, the Second Port of China

The splendid port works of Dairen, in many respects the best in the Far East, stand as a monument to Japanese enterprise. The work of construction and improvement has been vigorously pushed forward by the South Manchuria Railway Company until marvellous changes have been wrought on land and water. A full illustrated description of these port works appeared in the June 1922 number of THE FAR EASTERN REVIEW. It is difficult to keep pace with the constant improvements, additions and extensions planned and carried into execution by the S. M. R. authorities in order to cope with the increasing volume of trade. New concrete warehouses with special cargo working appliances have taken the place of the old open storage system, a beautiful modern fireproof office building houses all the different harbor offices and special equipment of all kinds has been installed and is being constantly extended to take care of the many





The Magnificent New Passenger Wharf at Dairen, erected by the S.M.R. Company. Unquestionably one of the finest of its kind in the world. This Wharf is still unfinished. It is to have a semi-circular entrance pavilion, built in ornamental concrete work which will add dignity to what is already a handsome structure

requirements of loading and unloading vessels. The handsome wharf office building referred to above is now having an addition built to it that will double its size, and a new up-to-date pier is nearing completion. This pier undoubtedly ranks as one of the finest in any port in the world, surpassing in its detail of construction and general appearance the pride of the Manila harbor board, Pier No. VII. A full and up-to-date description of the port of Dairen will appear shortly in a subsequent number of THE FAR EASTERN REVIEW and we content ourselves for the present with publishing three illustrations of the new passenger pier, whose entrance building is still under construction.

Tientsin's Fight to Maintain its Port

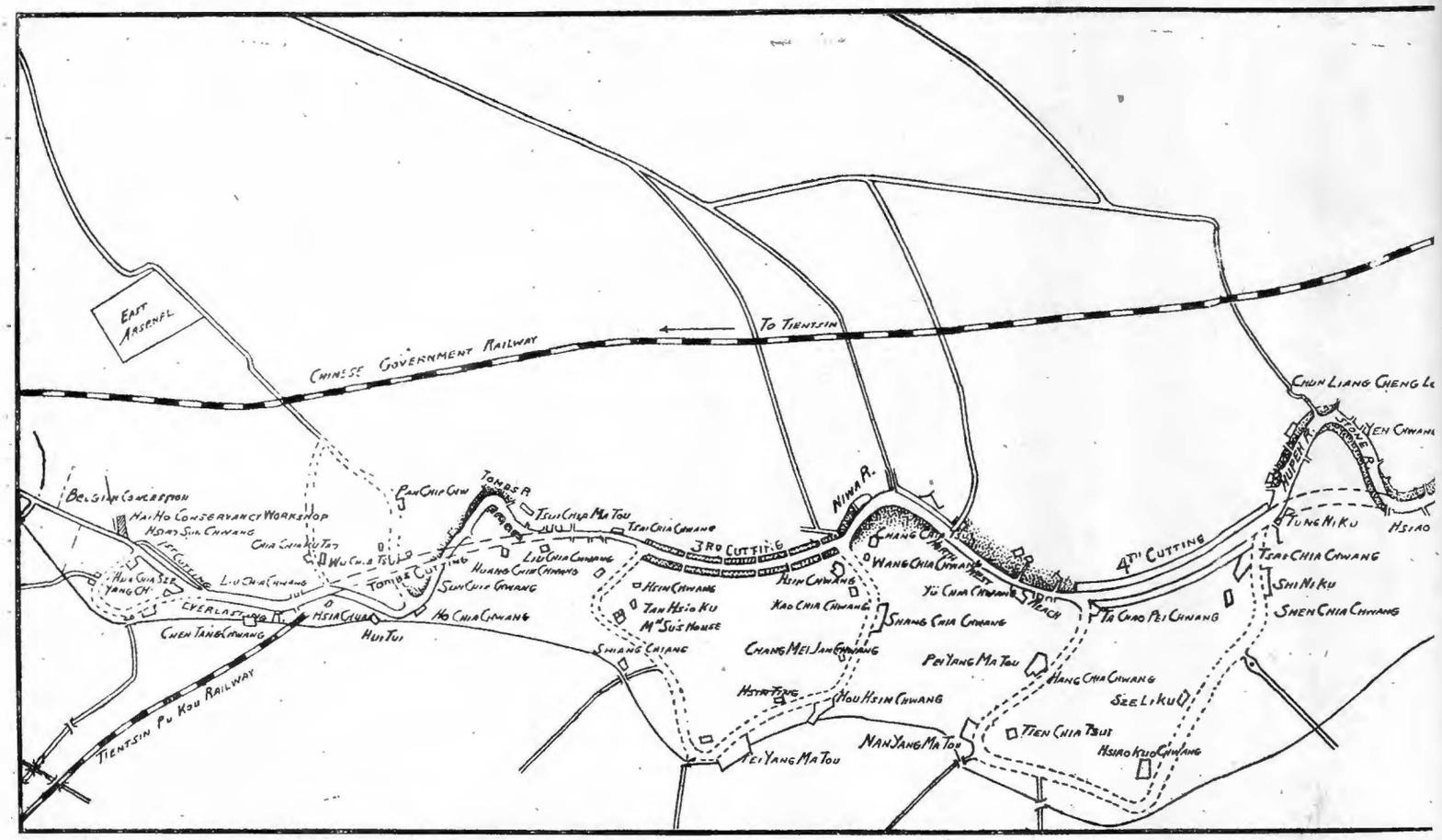
The problems confronting Tientsin's efforts to maintain its place as a coastwise port, in themselves quite formidable, are intensified many fold by the graver problems arising out of the inability of the Haiho to take care of the enormous flood waters that periodically devastate its hinterland. Two special commissions have been created to attend to these problems, one, the Haiho conservancy board, which maintains the river open to navigation from Tientsin to the sea, and the other the commission for the improvement of the river system of Chihli.

The work of the first body has progressed steadily and favorably since its creation, but each year seems to bring with it constant additions to the original project. Most of its work has consisted in making cuttings to straighten out the kinks in the Hai-ho's leisurely way to the sea, the work being performed by dredgers and excavators. A brief *resumé* of the Haiho conservancy work for the past ten years will give a general idea of the problems met with and solved in order that Tientsin may retain its position in the China coast trade.

What is known as the fourth cutting was opened to traffic on the 15th July, 1913. The total excavation was 865,000 *fang* and the cost was 27.3 candareens per *fang*. The third cutting, which was excavated by manual labor, cost 43 candareens per *fang*. The new cutting reduced the length of the river by 5.64 miles. The length of the river to-day is 36 nautical miles, whereas prior to the making of the cuttings the length was 48.8 miles. A new cutting—called Tombs Bend Cutting—was started in the spring of 1921, to be completed in the autumn of 1923. It will not shorten the river very much (about 1 mile), but eliminates four bad bends which hamper navigation and ice-breaking. The excavation is being done by dredger in a similar way as the fourth cutting.

Every technical authority who has examined the Haiho has urged the great improvement that would accrue in the propagation of the flood tide if the loop in the Peiho above the concessions could be removed, and in 1916 a company was formed at the instance of General Yang I-tê, and the expropriation of the site of the cutting carried out. The cutting was made in accordance with plans prepared by Mr. T. Pincione, engineer-in-chief to the Haiho conservancy board, under the ægis of the commission for the improvement of the river system of Chihli; but the cost was borne by the aforesaid company, which hopes to recoup itself by means of the land to be reclaimed in the old arm now cut off.

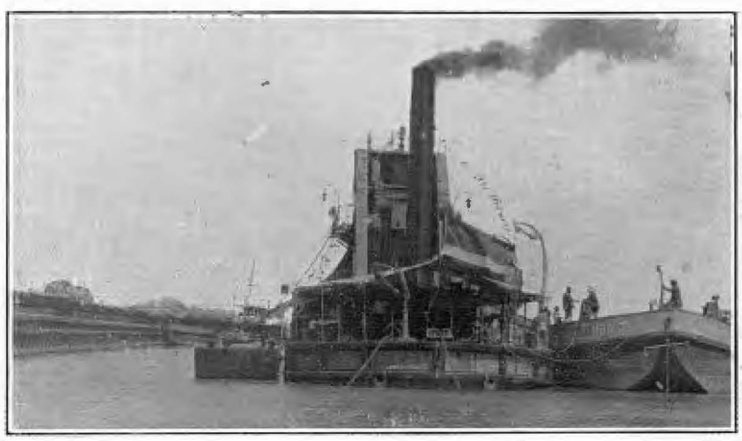
The beneficial effect of this work is evidenced in the improvement in the propagation of the flow tide whose rise and fall just above the cutting has increased by almost 3.5 feet. A subsidiary

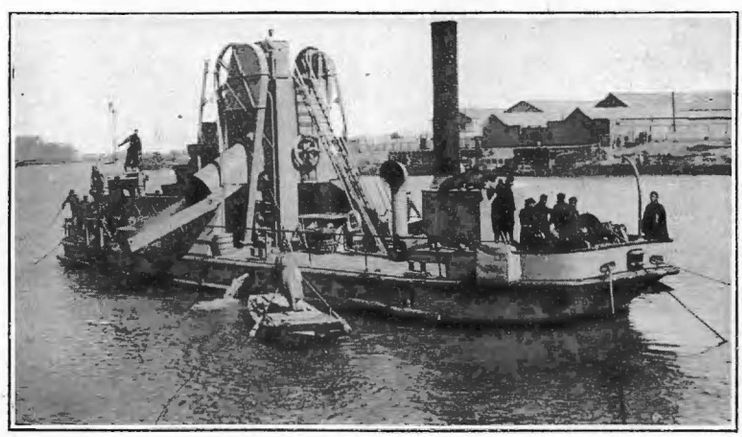


Plan of the Hai Ho Showing the Cuttings and Conservancy

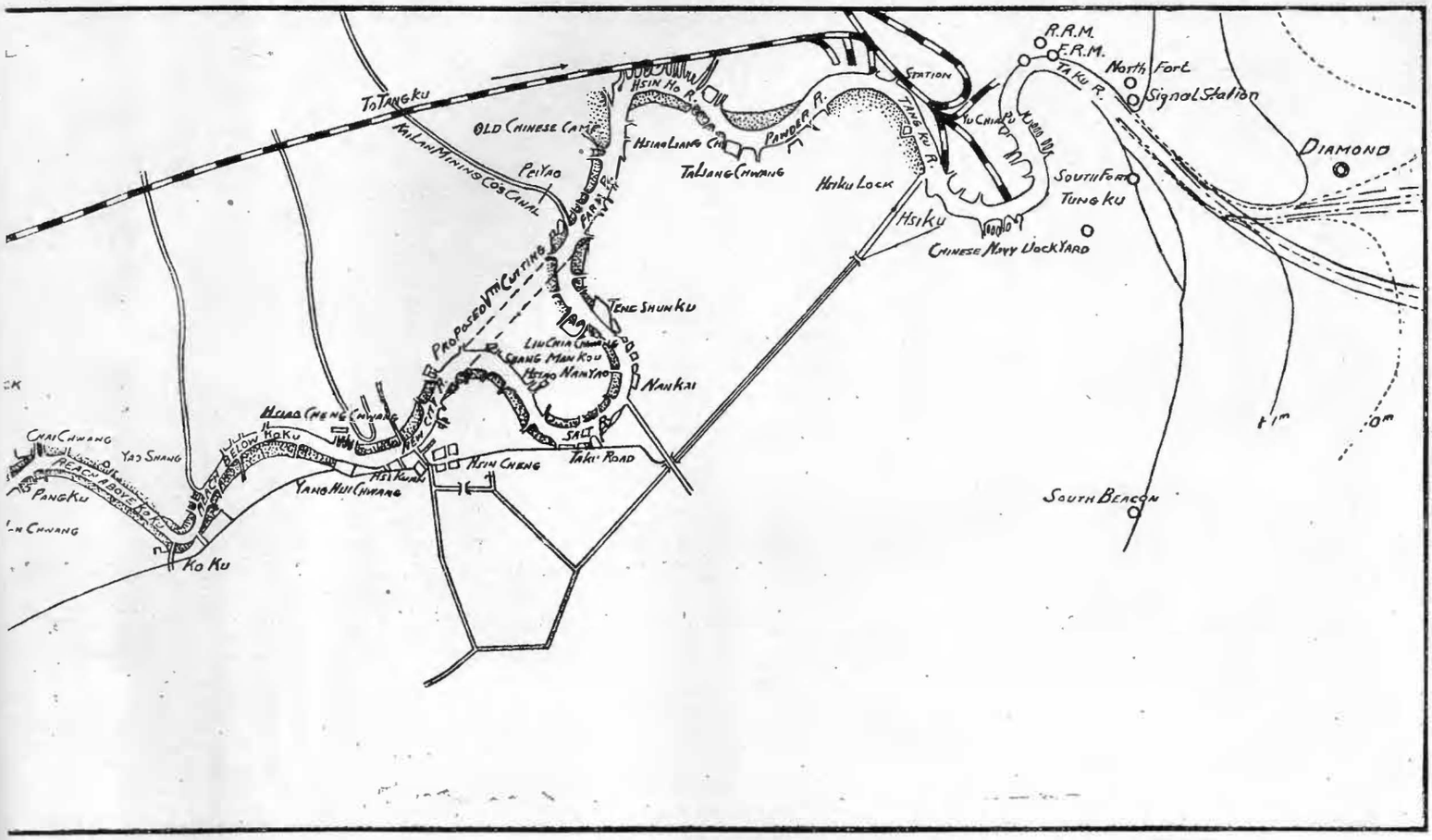
work was the making of a new outlet for the Grand Canal which now debouches just above the bridge opposite the governor's yamên. This has enabled the bridge at the former Hai-kuan-tao's yamên to be removed, a considerable benefit for street traffic. Arrangements are now being made for substituting the above-mentioned bridge opposite the governor's yamên with a mohern bascule bridge with a free opening of 100 feet.

As a further effort to improve the port, the Haiho conservancy commission recently approved and accepted the report of M. Perrier which provides amongst other things for improving the harbor facilities of Tientsin by dredging and building a new dyked-in channel 29,000 feet long across the outer Taku Bar, witd a low water depth of 20 feet, and involving a possible outlay of Tls. 2,200,000. The plan calls for the building, in a direction south by 56 degrees east, of two long dykes, providing a channel between them as wide as the present mouth of the Haiho, about 1,000 feet, and diverging slightly, as they extend out to the farthest end, to about 1,100 feet. This channel will be dredged by a special dredger to a depth of 20 feet at low water. Each dyke will consist of two lines of piles, for a short distance, ten, and the rest, five feet apart, filled in with rubble stone, which will also be placed outside at the base. The dykes will be elevated to 14 feet Taku datum at the top, and be of varying depths according to the set bottom over which they are built. For a distance of about 8,000 feet from the North Fort the dyke on the north side will be supported on either side by stone-faced low gradient earth banks, and will be 18 feet Taku datum at the top. By providing a low water depth of 20 feet on the bar, the new channel would enable deep draught vessels, now obliged to anchor eight to nine miles out beyond the bar, to cross the bar at high water, enter the river and even get up to Tangku, where they would find every facility for working their cargo under advantageous conditions. This would give inestimable benefits to shipping and commerce generally by reducing the heavy transhipment charges. In connection with this the Haiho river conservancy's plan of eliminating some of the remaining bends in the river, notably the Salt Reach bend, will be followed. Among the expenses that would be incurred is the purchase of a new hopper dredger at a cost of Tls. 450,000 and the adaptation of a present dredger at a cost of Tls. 50,000. The cost of constructing the dykes is estimated at Tls. 1,350,000. New workshops and installations at Tls. 341,000, making a total of Tls. 2,191,000.





Two of the Dredges Operated on the Hai-ho by the Conservancy Commission



Work from Tientsin to the Sea at Taku

Yangtze River Improvement not Worth While

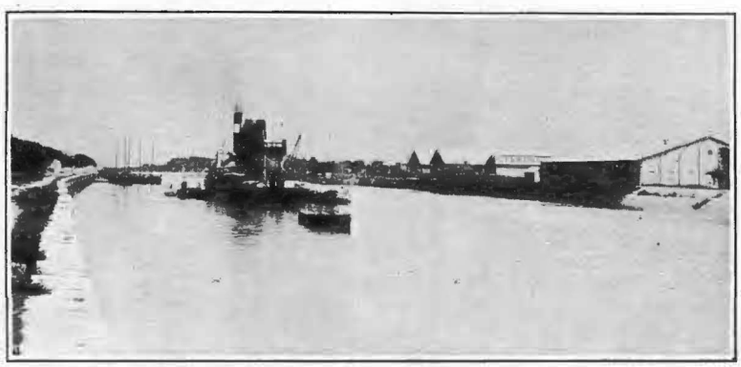
The most interesting and important navigation project in China which was hoped would bring Hankow into line as a permanent deep water port has been reported on unfavorably by Mr. F. Palmer, consulting engineer and British member of the Yangtze river commission. Intense disappointment has been manifested by every trading firm in China over his conclusion that the expense would not be justified nor the funds obtainable. In his report Mr. Palmer gives a description of the course of the Yangtze, taking it under three sections. Ichang to Chungking, Ichang to Hankow and Hankow to Woosung. As to the up-river stretch, he says that the value of the Hankow-Szechuan trade and the manner in which it is handled excludes the necessity of any extensive scheme of improvements.

Coming to the most important point of the problem, that of the Hankow-Woosung section, Mr. Palmer discusses the possibilities under three heads: (1) What improvement is possible? (2) What would it cost? (3) Would it pay? His conclusion is that to make Hankow accessible all the year round to ocean-going steamers drawing from 20 to 25 feet is out of the question.

He points out that in 1922 the total trade of all Yangtze ports above Shanghai was Hk. Tls. 482,402,000, while the revenue collected by the customs at Shanghai for up-river goods was about Hk. Tls. 10,900,000. Assuming a surtax of five per cent. on this the Yangtze river traffic would have produced a revenue of Tls. 545,000 which would allow a capital expenditure of Tls. 5,450,000.

In the short time that the commission had existed it was obviously impossible to gather any exact idea of costs, but Mr. Palmer estimated roughly that to remove only one of the obstructions to 15 feet draft navigation would call for Tls. 3,500,000 and there are eight such obstructions between Wuhu and Hankow. This would call for an approximate Tls. 25,000,000 alone. Mr. Palmer then considered the possibility of dredging and concluded that the capital cost might amount to Tls. 2,500,000 and the operating costs about Tls. 350,000 per annum. Fixed charges and interest at 6 per cent., and amortization at 4 per cent. would amount to ten per cent. so the total annual charge would be about Tls. 600,000, a year, sum exceeding the five per cent. surtax already referred to. To cover this cost it would be necessary to increase the surtax to 7 per cent. on the trade of all Yangtze ports above Shanghai.

In investigating the value of the trade benefits to be obtained by removing the obstructions to 15 feet draft vessels, Mr. Palmer found that it would approximate Tls. 168,000 per annum and it



The Hai Ho at Tientsin.

Huge Shale Oil Distillation Plant for Fushun

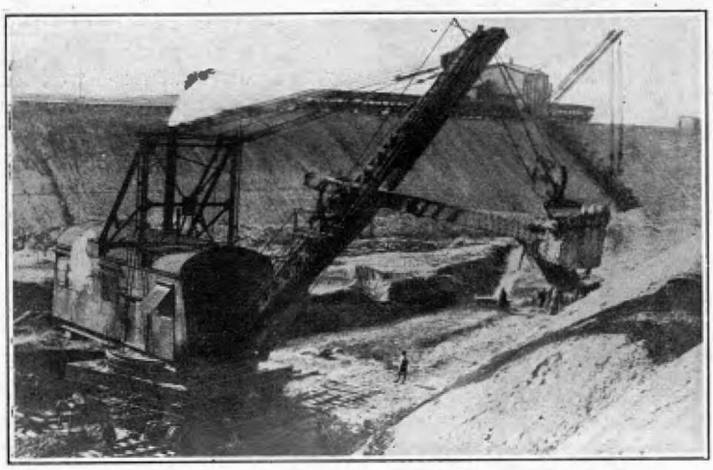
(Continued from page 477)

while she has been extending her control over new foreign deposits, the entire nation has stood solidly behind its government. There is little doubt that when the Japanese people understand the vital necessity of controlling similar oil supplies in territories which they hold in lease, they also will come together in support of an undertaking which promises them relief from foreign importations.

Although the Scotch report places the oil percentage 10 per cent. lower than originally expected by the Railway Company and the returns of sulphate of ammonia, a by-product, are quite discouraging, these somewhat unsatisfactory returns are discounted by Rear-Admiral T. Makino, now in the service of the S.M.R. Co., in charge of the new oil shale industry. He commented on the report from Scotland in substance as follows:

"In the first place the transportation of shale over so great distances has reduced it in size far below 2 inches in diameter which is accepted as the right size for distillation purposes. Moisture was absorbed and it was subjected to great heat in the ship's hold while under transit through the tropics. Owing to the reduction in size, the pieces of shale have become more susceptible to weathering action.

"The report admitted that better returns may be obtained, if experimented upon at the place where the shale has been mined.



Bucyrus steam shovel and excavator in open cut work at Fushun

The effect of weathering action had been expected by the railway officials and while the above returns cannot be taken for granted as applicable to all cases, if the interest on the fixed capital, and depreciation for buildings, machinery, etc., not to mention a suitable margin of profit, as in the case of a general business corporation, were to be taken into reckoning, the oil shale industry could hardly be said to have big prospects as a paying venture. It would seem, however, that the contemplated investment will be justified by the returns. This is epecially so, since the Scotch experiments found the cost of production to be very much lower than had been calculated by the railway officials."

Mr. M. Umeno, director of the S.M.R. Co., has stated that the question now is whether the shale distilling plant can be commenced on as large a scale as desired by the navy. The navy expects the new experimental factory to be capable of turning out 50,000 tons of shale oil a year, and has proposed to take the whole output at such a price as to cause no loss to the railway company.

"By our own experiments, he said, "the profit on this new enterprise was made out to be 35 per cent. According to the first report from Scotland, the profit margin is put at 15 per cent., which will make the scheme quite possible if the contract with the navy runs for 20 years or longer."

The oil shale at Fushun lies over the immense coal seam and is about 4,000-ft. in thickness containing roughly 5,500,000,000 tons. The oil percentage varies from 10 per cent. to 4 per cent. with the average of 5.5 per cent. The oil is extracted by dry distillation. The total oil obtainable will be 300,000,000 tons, or one-fifth of the total petroleum reserve of the United States. Figuring the total annual consumption of Japan, including what is for naval use, at 1,500,000 tons, the Fushun shale oil may supply the annual wants for 200 years.

The oil shale, that the S.M.R. Co. is planning to work in the open cut zone, amounts to about 500,000,000 tons, from which 2,300,000 *koku* of heavy oil will be obtainable by dry distillation.

Big Supply

The oil shale reserve, if divided according to the different pits, will be as follow:

Open cut	538,843,981
Oyama shaft	712,546,952
Togo shaft	387,698,753
Laohutai pit	601,787,329
Wantawu pit	726,689,171
Hsintun pit	1,108,430,492
Lungfeng pit	1,023,665,734
Talien pit	377,603,005
Total	5,477,265,417

The estimated reserve according to the depths from the surface ground is: Down to 100-ft. deep from the surface ground, 252,000,000 tons; down to 200-ft., 505,000,000 tons; down to 300-ft. 756,000,000 tons; down to 500-ft. 1,223,000,000 tons; down to 1,000-ft. 2,380,000,000 tons; down to 2,000-ft. 3,415,000,000 tons; down to 3,000-ft. 4,932,000,000 tons and down to 4,500-ft. 5,477,000,000 tons.

Fushun oil shale, in spite of its small oil percentage, possesses economically workable value, owing to the following reasons: Its existence in a very thick stratum overlapping the coal seam at accessible depths from the surface ground; availability of cheap labor; abundance of coal for fuel obtainable at a modest price; ample communications and plenty of water for industrial use.

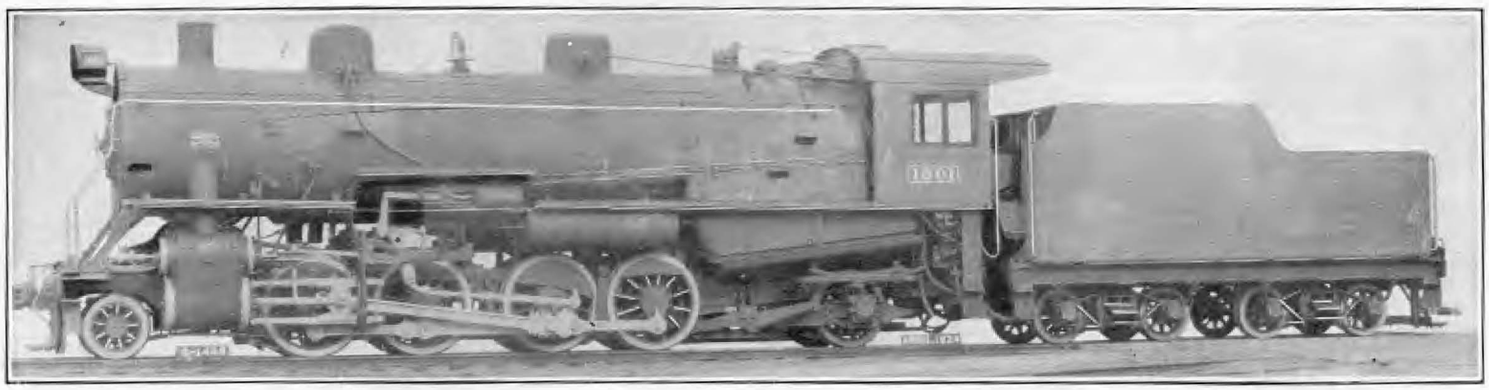
How far this immense shale reserve can be mined awaits fuller study, and the problem must be solved by taking into account the demand for petroleum and the cost of production. In case of these two conditions being favorably met, the exploitation of 2,000,000,000 tons of oil shale is not considered difficult from a technical standpoint.

The New Ambassadors

THE selection of a proper successor to Mr. Hanihara has had the most careful attention from the Tokyo government and from a list of names including Baron Matsui, Viscount Ishii, Ambassador Hioki and Mr. Tanaka, all able diplomats of ambassadorial rank, the choice has fallen on Baron Matsui, the predecessor of Baron Shidehara in the foreign office. Scholarly, dignified, conservative, polished to a high degree, with a personal charm that invites friendship and confidence, added to a profound knowledge of international law, Baron Matsui is eminently qualified to represent his country at Washington and carry through the delicate negotiations interrupted by the resignation of his predecessor. Both Japan and America are to be congratulated on the appointment.

In the same spirit that moved the Japanese government to select its best available diplomat for the Washington post, President Coolidge has exercised unusual care in picking the proper successor to Cyrus E. Woods. In naming Edgar Addison Bancroft as ambassador to Japan, the president has acted as wisely as was possible under our antiquated system of selecting a man for such a major diplomatic post. Such appointments whenever possible should be made from the best equipped men in the diplomatic service but as it is as yet too early to place our new system into practice, the president has been forced to seek a man with special fitness for such a task. Mr. Bancroft admirably fills the requirements. He is a lawyer of national reputation, scholarly and cultivated with broad sympathies and high principles.

His special recommendation for the post is that he will be fair and judicial and meet each question as it arises with an open mind. It is all that both nations can reasonably hope for at this particular juncture, and the fact that Mr. Bancroft has the advantage of starting his diplomatic career with a clean slate free from previous experience and prejudices, will make him freer to do what he believes ought to be done. On this basis, the Japanese extend the glad hand of welcome to the new American ambassador and stand prepared to meet him in the same open and frank spirit which has always characterized their friendship for America.

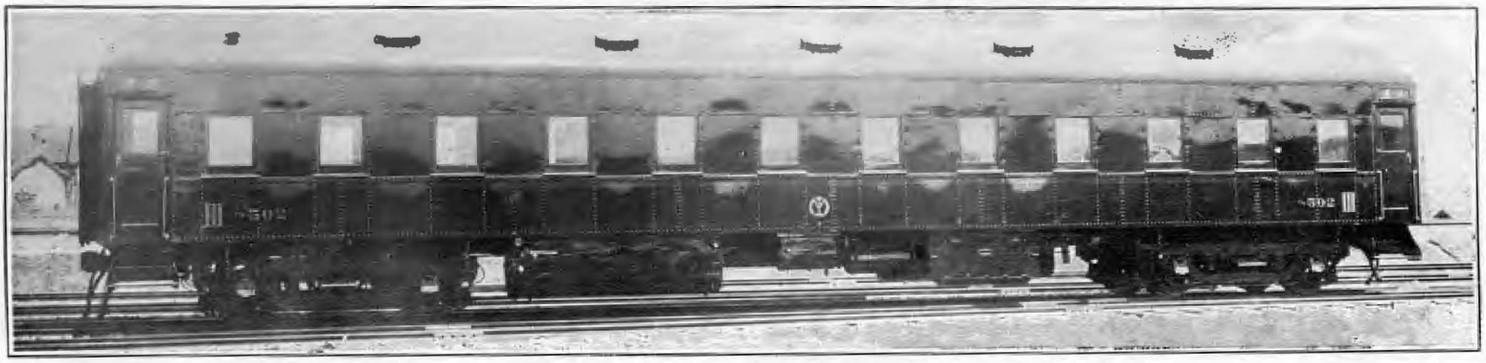


Three Cylinder Tender Type, 8-wheeled Locomotive for the South Manchuria Railway built at the Schenectady Works of the American Locomotive Company

Three-Cylinder Locos and All-Steel Cars for the S.M.R.

IN our last number appeared an illustration of the new all-steel cars for the Kobe municipal tramways now under construction at the Tanaka Iron Works in Osaka. The imperial Japanese government railways is also conducting investigations with the view of superceding its wooden passenger coaches with all-steel cars on the main lines of communication and is watching with considerable interest the experiments made by the South Manchuria Railway Company whose great shops at Shakako near Dairen has built several of this type for their own use.

these all-steel cars in the Shakako shops is slightly higher than the cost of importing them from foreign makers, so there is no immediate intention on the part of the S.M.R. authorities to build further coaches of this type at their own shops. Our illustration show the exterior and interior of the standard third-class passenger all-steel coach turned out by the Shakako Works and we also reproduce the illustration of a new type of refrigerating car for the S.M.R. built at these shops. This type of car was also designed by the S.M.R. engineers to keep in close touch with the developments of the cold storage traffic in meats and



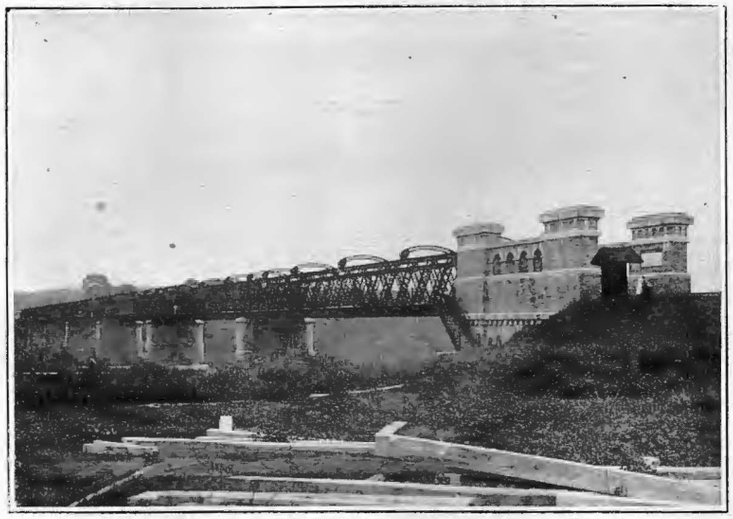
These shops are fully equipped for turning out this class of work and as an experiment four were originally built under the supervision of Dr. Yokui, director of the shops, and their operation carefully watched by the operating department of the railway. These first experimental all-steel coaches were found to be unsuited in some respects for the climate and certain modifications were made in the newer cars which are now proclaimed eminently suitable for the traffic. For the present, however, under prevailing economic conditions with its high costs of manufacture, the cost of constructing

Interior View of Third Class All-Steel Passenger Coach Built at the Shakaku Works of the S.M.R.
Exterior of Third Class All-Steel Passenger Coach Refrigerator Car for the S.M.R.

fruits from Manchuria for the Japanese market. The peculiarity of these cars is that they can be converted at will into refrigerator or santhermic cars. On their trial test the temperature inside the car was maintained at 4 deg. C. while that outside stood at zero. The interior of the car is lined with asbestos. Several of this type have been turned at Shakako and are in service for transporting fruits and other perishables susceptible to freezing temperature.

In April of this year the S.M.R. ordered from the American Locomotive Company five

(Continued on page 497.)



Victoria Bridge over Perak River at Enggor

The Jelai Bridge over the Pahang, under Construction

Seven other small girder bridges and all foundations, piers and abutments for the Nal bridge were also completed during the year. The expenditure amounted to $1,702,132.

The East Coast Railway, Pahang section, was opened for traffic as far as Kuala Lipis (141½ miles from Gemas) in October, 1917. The section from Kuala Lipis to Padang Tungku, five miles 49 chains in length, was opened for traffic on the 16th March, 1921, and the section from Padang Tungku, mile 147½, to Chigar Perah, mile 163½, was opened for traffic on 15th November, 1923. The work now in progress commencing from Chigar Perah runs northwards towards Tumpat. The distance from Chigar Perah to the Pahang-Kelantan boundary is 24 miles and the total distance Chigar Perah to Tumpat is 164 miles. The distance from railhead, Pahang, to railhead, Kelantan, is 98 miles. During the year 38,865 cubic yards of earthwork were executed on the main line and 14,026 cubic yards in stream diversion of which 695 cubic yards were rock. Two thousand six hundred and forty-six cubic yards were done in station yards and 16,002 cubic yards on account of slips. The Jelai bridge, which is the largest on the section, consists of two spans of 200-ft. and two of 100-ft. Considerable difficulties were experienced in the mid-stream foundations, but the bridge was completed early in November, 1923.

Messrs. Topham, Jones and Railton, Limited, contractors for the Prai jetty, wharves, etc., commenced work in May, 1918. The land works under this contract including the blockwork wall with the exception of the gap left opposite the old Prye Dock, were completed. Unexpected difficulty was met with in dredging owing to the excessive siltage.

The contract for the causeway across Johore Straits was let to Messrs. Topham, Jones and Railton, Limited, who commenced work in June, 1919. The lock at Johore was taken over by the Federated Malay States Railways on the 1st January, 1923, and has been in regular use by shipping since that date, the total number of craft passing through the lock during the year being 13,513. The rolling lift bridge, carrying the railway and roadway across the lock, was completed, the operating cabin was erected and the electrical operating and controlling gear was installed and connected with the Johore power station. On the opening of the causeway for railway traffic the wagon ferry power house and the landing stage on the Johore side of the Straits were dismantled and removed to allow the east and west wing walls of the lock to be completed.

The Penang hills railway† line was completed and opened for passenger traffic on 21st October, 1923. This railway was handed over to the colonial government as from 1st January, 1924, and is being operated by the Penang municipality.

Three-Cylinder Locos and All-Steel Cars for the S.M.R.

(Continued from page 495.)

three-cylinder locomotives the first of their type to be used in Asia. These are now being delivered and will be placed in operation this month. The type is known as a "Three-cylinder 8-wheeled tender locomotive and are built to the following particulars :—

Gauge, 4-ft. 8½-in. ; cylinders, 22½-in. d. by 26-in. stroke ; driving wheel diam., 54-in. ; boiler, inside d. 80-in., pressure, 180-lbs. ; fire box, length, 114⅛ -in., width, 84¼-in. ; tubes, No. 245-42 ; diameter, 2-in.-5⅜-in., length, 18-ft. 6-in. : wheel base, driving, 15-ft.-10-in. ; engine, 34-ft. 2-in., engine and tender, 62-ft. 7¼-in. ; weight in working order (pounds) leading, 21,000 ; driving, 194,000 ; trailing, 48,500 ; engine, 263,500, tender, 135,500. Heating surfaces (sq. ft.) tubes, 2,361 ; flues 1088, fire box 217, arch tubes, 29, total 3,695 ; superheater, 945 ; fuel, soft coal ; grate area, 66.8 sq. ft. Maximum tractive power, 56,000-lbs. ; factor of adhesion 3.46 ; capacity, water, 6,000 gals., fuel, 10 tons.

The Kedan Bridge

Lipis River Bridge, Pahang

TRAMCARS FOR NANTAO COMPANY.—Tenders for the supply of 12 tramcars were recently asked by the Chinese Electric Power Company, Ltd., Nantao, Shanghai. The company plans to extend its services between Nantao and Shanghai.

ANTUNG-WIJU STEAM-MOTOR CAR LINE.—The steam-motor car service between Antung and New Wiju across the Yalu railway bridge has been started. The New Wiju-Shahochen (the station next Antung) route will be divided into two sections. The Shahochen-Antung section will form one section, and the Antung-New Wiju, another.

RAILWAYS

PEKING-MUKDEN DOUBLE TRACKING.—Mr. Shui, managing-director of the Peking-Mukden railway, in a petition to the ministry of communications concerning the construction of a new station between Yangtsun and Tientsin, says that as the government had already decided to build a double track for the Peking-Tientsin section of the Ching-Fen line, provision should be made to construct the new station in such a way as to accommodate increased traffic. Mr. Shui urges that the budget for building the station be increased in $60,000 instead of $48,000 as sanctioned by the Chiaotungpu previously.

In connection with this report, information from the Chiaotungpu says that the government, in view of the increased traffic between Peking and Tientsin, is inclined to accept the proposal of the director for the construction of a double track and that work will commence as soon as funds can be secured.

KAIYUAN-TAOLU LINE.—Referring to the proposed construction of a light rail line between Kaiyuan and Taolu, in the Tungshan (Eastern Hill) district, the tenders for necessary materials have been awarded to the Wato Yoko, a Japanese firm of Changchun.

S. M. R. NEW CARS.—Three new observation cars are under construction at the South Manchurian railway workshops, Shakako. They are for the S.M.R. main line to replace in November next cars now in service, which will then be transferred to the Chosen line.

TELEPHONES AND TELEGRAPHS

PHONE SERVICE FOR LIAOYANG.—The Chinese Telephone Office, Liaoyang, has opened part of the new telephone service installed within the walls to traffic. It planned to throw open the entire system to business from October 1. The Chinese government offices and business houses having relations outside the walls and the railway town continue to make use of the Japanese telephone service, which is thought to be affected but little by the establishment of the Chinese system.

NEGROS P. I. PHONE CO.—Prominent American and Filipino business men in Negros Occidental combined capital to establish the "Negros Telephone and Telegraph Company" in Bacolod, Occidental Negros, has been incorporated with a capital stock of Ps.500,000, divided into 5,000 share at Ps.100 each. Theo. Vail Ralsey, Geo. J. Petty, S. Javier, L. Atotubo, T. Sevilla, R. Barcelona, and J. E. H. Stevenot, who is also the treasurer, are the directors of the new firm. The capitl subscribed at the time of its registration amounted to Ps.200,000 and capital paid is Ps.50,000.

CHOSEN-MANCHURIA LINE.—By the end of October, the new Pingyang-New Wiju telephone line will have been completed by the Chosen government. This will supply the last missing link between the through long-distance telephone service between South Manchuria and Chosen, in connection with the Mukden-Antung line installed in December, 1920. On the completion of the through line, traffic will be opened between Mukden and Pingyang and between Antung and Pingyang and Chinnampo.

LONG-DISTANCE SERVICE.—The long-distance telephone between Nantungchow Chungming, and Haimen, Kiangsu province, is now in use.

CHOSEN-MANCHURIA, PHONE SERVICE.—The projected telephone service connecting Chosen and Manchuria is expected to be completed in November, work on the section between Heijo and Shingishu now going rapidly.

HSUCHOW AND HAICHOW LINE.—Seeing that the section of the Lung-Hai Railway between Hsuchow and Haichow, Kiangsu province, soon will be completed, the ministry of communications has decided to set up a new telegraph line between these two cities. At present messages from Haichow to Hsuchow or vice versa are despatched via Tsinkiangpu.

NEW LOYANG LINE.—Some time ago, Gen. Wu Pei-fu requested the ministry of communications to instal a long-distance telephone system between Loyang and Kwanyingtung, exclusively for his use. This service is now in course of completion.

SHIPPING

N.Y.K. ORDERS LINERS.—The Nippon Yusen Kaisha placed an order recently with the Yokohama Dock Company for two new passenger steamers. The new liners are to be placed on the run between Kobe and Shanghai and are to be placed in commission in one year. They are to be of 3,100 tons gross and have a deadweight tonnage of 3,900 tons with a speed of 15 knots. Passenger accommodations will be provided for four in the first cabin and 90 in the steerage.

O. S. K. BUYS NEW SHIPS.—Plans for the material improvement of the Osaka Shosen Kaisha's South American passenger service has been announced as the result of the adoption at the last session of the Diet of the governments policy to concentrate its available energy on the transportation of Japanese emigrants to South America. The Osaka Shosen interests have asked Y.6,500,000 from the Mitsubishi management. It was decided in negotiations that the firm could float debentures to that amount on acceptance by the Mitsubishi Bank. The ships will be constructed at the Mitsubishi Shipbuilding Yard, in Kobe. The keels of the first liner will be laid down in the near future. Debentures will also be floated in course of time. Each ship will have 7,300 tons gross and 12,200 displacement tonnage with a total carrying capacity of 8,400 tons. Each ship will be equipped with refrigeration capable of accommodating 250 tons. The ship will carry 40 cabin passengers and 780 in its steerage. Maximum speed be 16 nautical miles an hour. The service is now cared for by two ships. The completed fleet will consist of five ships. Ten round trips will be made by each yearly. The present trip, requiring 64 days, will be shortened to 45 days. The first ship will be finished in October, 1925, and the second one in February, 1926. The third and last ship will be completed in June, 1927.

S. M. R. CO., NEW COLLIER.—The new S. M. R. collier *Bujun Maru* has been launched at Schiedam, Holland, and will proceed to Dairen under her own steam. The main object of the vessel is to load coal into ocean-going vessels, either inside or outside the harbor, which are not alongside the wharf. Details of the new collier are as follows: Hold capacity, 1,000 tons; fitted with automatic conveyor and self-registering weighing machine; discharge of coal from hold by bunkering ladder and telescopic shoot into bunkers of ships being coaled. The hull is divided into self-emptying hoppers, the bottom of each being equipped with vertically opening sliding doors to communicate with a tunnel on vessel's keel; at bottom of tunnel and further along inclined bunkering ladder, is an endless conveyor to which an endless trough is bolted, divided into series of pockets by means of upright standing plates; the coal slides through hopper doors into these pockets and before it passes to the inclined bunkering ladder, it is carried over self-registering weighing machines. The vessel is fitted with two vertical compound condensing engines, each developing about 250 I.H.P.

SHIPPING COMPANY IN MANCHURIA.—Authorities in Manchuria are planning to organize a shipping company for the three eastern provinces. The company is to be started under official auspices and to partake of the nature of an official organ. It is to have control over all shipping affairs on the Liao, the Sungari and the Amur rivers. Kwei Sheng, former civil governor of Kirin, has been nominated director of the company.

MINES

GOLD MINING ABOUT AIGUN.—Developments in the gold mining industry about Aigun during 1923 were the brightest feature of the year's trade, says Mr. R. F. C. Hedgeland, commissioner of customs. The gold output was 136,169 troy ounces, valued at Hk. Tls. 3,235,900, of which three-quarters came from the Feng Yuan Gold Mining Company. In 1918 this concern took over two smaller operators, and in 1922 rich deposits were found at Wutakow and Chutuho, where new towns have grown up in the last 12 months. The commissioner says the difficulty of transport over bad roads restricts operations, and the need of a railway to serve the district is becoming urgent.

NEW COLLIERY IN KIRIN.—Last spring, two Japanese of Mukden struck a coal mine at Tashahotzu in Itung, Kirin province. This find is said to be of a considerable magnitude, giving coal of good quality. With several Chinese, they founded a company under Sino-Japanese joint management capital of S.Y.100,000. A gang of 12 Japanese miners, besides 160 Chinese, were put to the work of experimental mining. A layer of coal, about 7-ft. in thickness, has been struck at 35-ft. underground. This seam is reported to extend over a large area, and is said to promise great possibilities. The management has approached the S. M. R. Co., to lay out a coal yard in the railway town of Changtu, and construct a railway for the exclusive use of the new colliery from Changtu station.

COAL WASHING AT FUSHUN.—The foundation work for the new coal washing equipment to be installed at Kuchengtzu mining office of which Mr. T. Onuma, in superintendent, is expected to be finished before winter, and the installation of the machinery will be taken up in April. The machinery has a capacity for washing 16,000 tons of coal in 16 hours. The coal will be improved in quality, but will not be raised in price according to the management which hopes to clear an extra profit by turning out more lump and medium-lump coal.

SPENDS MILLIONS: NO OIL.—After spending approximately Ps.3,000,000 in continued operations in search of oil deposits on Bondoc peninsula, Tayabas, the Richmond Petroleum company, through its local representative, C. T. Newcomb, has made formal announcement of its decision to discontinue drilling activities in the Philippine islands for the present at least. It is the company's intention to surrender all government and private lands and exploratory areas covering the territory now under lsaees and permits, he said. It is possible that further geological studies will be made of other parts of the islands. According to Mr. Newcomb, the Richmond Petroleum Company has drilled at Bondoc peninsula a total footage of 10,814. The Muguis No. One was drilled to a depth of 1,323-ft., Sapa No. One 3,757-ft., Pina No. One 5,117-ft., and Yebaan No. 1 617-ft. In gaining this footage slight indications of petroleum and naturalgas were encountered, Newcomb declared, but nothing that even nearly approached oil of commercial quantity was found under the structures tested through the wells.

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

遠東時報

上海仁記路第五號

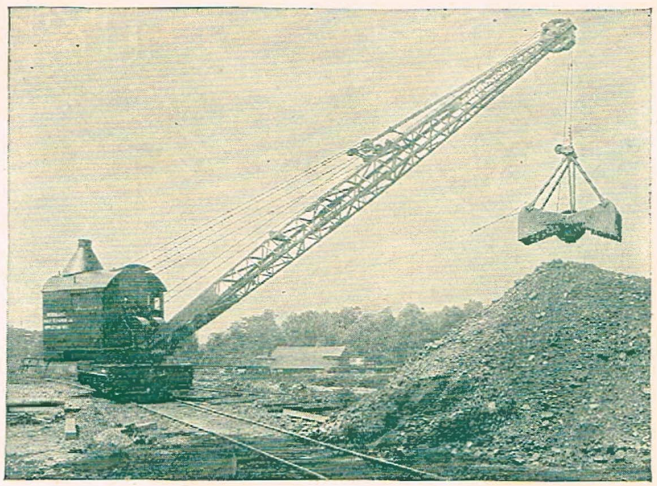
WHAT HAPPENED IN GENEVA

THE GREATEST CIVILIZING FORCE IN EASTERN ASIA :
THE WORK OF THE S.M.R.

AMERICAN-JAPANESE CO-OPERATION
RAILWAYS AND TRAMWAYS IN KOREA
SUPER-POWER DEVELOPMENT
SIAMESE RAILWAYS WORKSHOPS
MINING PROGRESS IN N.E.I.
CHINESE TELEPHONE SYSTEM
JAPAN'S TELEPHONE RECONSTRUCTION
A SHANGHAI FLOUR MILL
JAPAN'S COAL TAR CHEMICAL INDUSTRY

Vol. XX | November, 1924 | No. 11

Browning Economy is Two-Fold!



HEAVY material handling with a Browning Locomotive Crane effects a duel saving. It means (1) economy in depreciation—because Brownings last longer with less upkeep expense; and (2) economy in plant operation—because they do more work, better work and faster work.

A Browning operates with Bucket, Magnet, Hookblock, Dragline, as a Steam Shovel, Pile Driver and Switch Engine, and effects savings however it may be used.

THE BROWNING COMPANY

CLEVELAND, OHIO, U.S.A.

Cable Address: "BROWNING"

BROWNING

LOCOMOTIVE CRANES AND BUCKETS

REA'S FAR EASTERN MANUAL
1924

The 1924 edition of this stupendous compilation of concrete facts, covering the main Engineering and Industrial establishments of Eastern Asia, should be on the desk of every executive of the Engineering and Financial professions doing business in the Orient. Order your copy now.

Price Mexican **$25.00** or its equivalent

GEORGE BRONSON REA, M.E.

Editor and Publisher

16 Jinkee Road *Shanghai, China*

Railways and Tramways of Korea

A Profitable Field for American Capital

The Government's Program Calls for Building Nearly 4,000 Miles of State Railways to Which is Added Another Thousand Miles of Private Railways

THE success attending the flotation in New York of the $10,000,000 loan to the Oriental Development Company for its enterprises in Korea, has attracted the attention of American bankers to the possibilities of that country as an investment field and it is reported that a special investigation is now being conducted in connection with the further development of private railways in that country by American capital. The excellent work of the Oriental Development Company in afforestration, reclamation, irrigation and development of agriculture in various parts of Korea is closely allied with the growth of transportation facilities and there is reason to believe that the American banking group which issued the previous loan may interest itself further in furnishing the funds for railway construction.

Korea enjoys a unique position amongst the countries of Eastern Asia, appealing strongly to the banker as a safe field for profitable investment because of the guarantees of law, order and stability in the country since it was annexed as part of the Japanese empire. With a population of 18,000,000 hardworking and peace-loving people, doubling their numbers in about thirty years, the development of the national resources becomes a problem of the first magnitude. When this is supplemented by the pressure of the population on the food supply in Japan proper, the necessity of bringing every available acre of agricultural land in the empire under cultivation is one of the most important questions that confronts the cabinet at Tokyo.

Up to a few years ago, strategic considerations played the most important part in the construction of the main Korean trunk lines. The war with Russia forced the completion of the through north and south trunk line and during the years which followed when Russia was building the Amur line and making herculean efforts to get into a position to resume the conflict, the Japanese government was faced with the burdensome task of rushing forward the construction of essential railways in Korea as part of its main line of defense. As soon, however, as these were completed and the menace of Russia became less alarming, the Korean construction program was slacked up. Regulations for private railway enterprises were promulgated and encouragement extended to private capital in order to develop the districts off the main trunk lines operated by the government. Recently, however, the Korean government has taken a renewed interest in railway development. A plan was devised in 1921 for building a net-work of 65 lines with a total length of 5,000 miles to be completed in 1927. This scheme, however, is being held up for lack of funds due to the continued depression in Japanese financial circles. This one fact will help to understand the importance attached by the Japanese and Korean governments to the rapid development of the country and the exploitation of its agricultural, and other resources in order that the empire may be self-supporting as soon as possible. The present mileage of the Korean state owned railways in operation is 1,165 miles, with 465 miles of private owned lines in operation and under construction out of a total of 1,668 under charter. Although the rapid completion of this program will depend largely on the ability to finance it, it is safe to predict that it will be carried through within a reasonable time and the little peninsula of Korea will boast as many miles of railways as the vast territory of its huge neighbor.

State Owned Railways

The following brief resumé of the government operated lines in Korea will serve as a basis for the information about the private owned railways and tramways. The first railway in Korea was the Seoul-Chemulpo line opened to traffic in 1899. In 1901, the Seoul-Fusan (Kei-Fu) Railway Company was established and commenced the construction of the southern link of the main trunk line from Seoul to the port of Fusan. In 1903 this company acquired the line from Seoul to Chemulpo.

In 1904 the line between Seoul and Fusan was opened to traffic, and in 1905 the line between Seoul and Shingishu and the Basan line were completed for the use of the army during the Russo-Japanese war. In 1906 the Japanese imperial government bought out the Kei-Fu Railway Company and took over the Keijo-Shingishu and the Basan lines from the department of war, and all were placed under the control of the railway superintendence bureau of the residency-general of Korea.

In 1909 they were again made part of the Japanese government railways, but, on the government-general of Korea being established in 1910, control once more changed hands. During all this time improvement and construction work was steadily carried on, and the year 1910 saw the completion of the line between Heijo and Chinnampo; in 1911 the Yalu was spanned by an iron bridge, connecting the Korean railways with the South Manchuria railway; in 1914 the line between Taiden and Moppo and that between Keijo and Gensan were completed; in 1915 part of the line between Gensan and Kwainei was opened. The last named is still under construction, but traffic is being regularly conducted between Seishin and Kwainei and Yujo and Shuotsu in its northern part and between Gensan and Kanko in its southern part.

Single control of the railways in Korea and Manchuria being considered advisable on account of their economic and communicative relations, the government-general of Korea in accordance with an imperial ordinance of the 31st of July, 1917, concluded a contract with the South Manchuria Railway Company entrusting to it the management of all the state-owned railways in Korea from the 1st of August following.

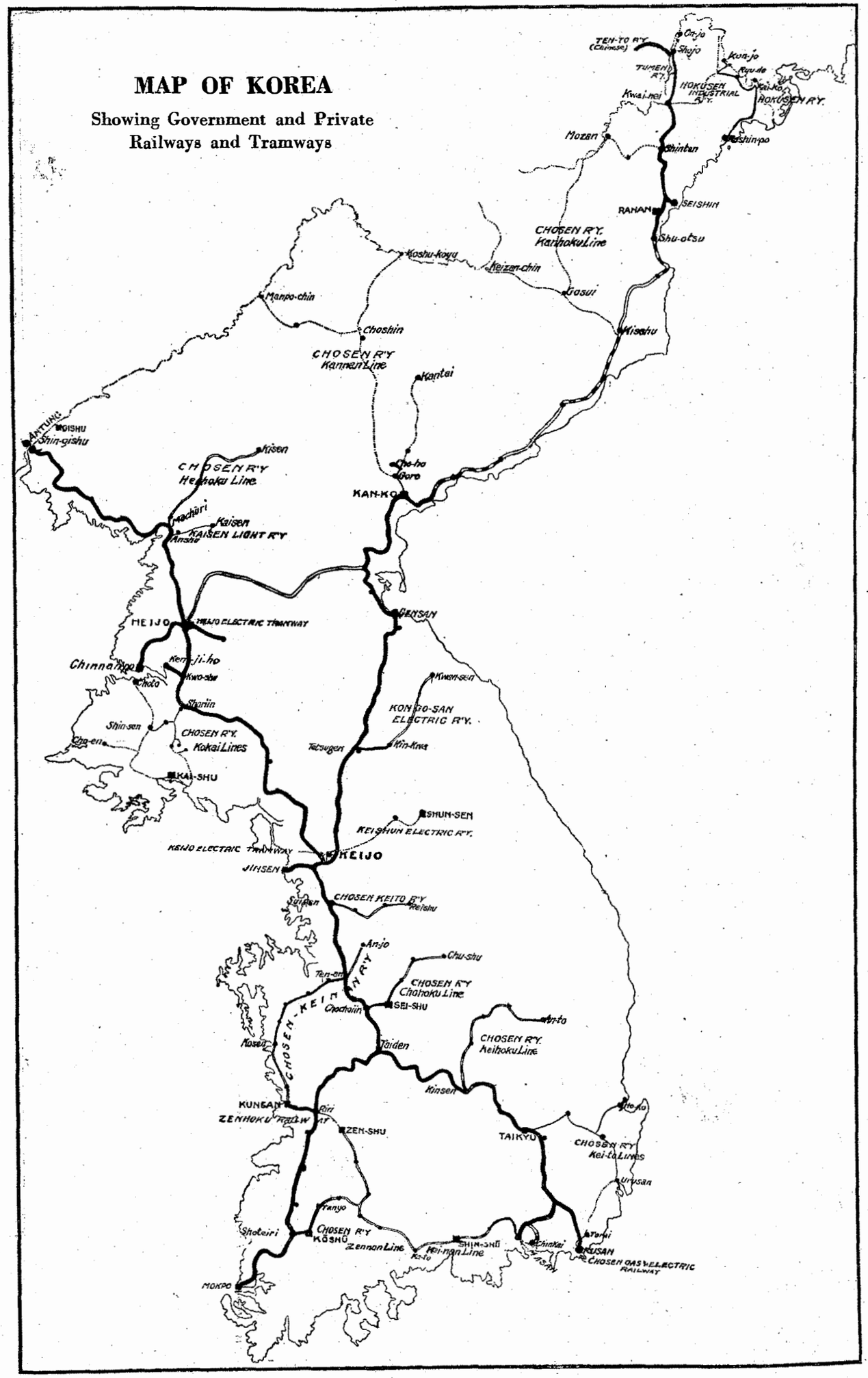
According to this contract the entire management of the state-owned railways in Korea, except the formation of plans for new construction and improvement and the provision of capital for the purpose of carrying them out, was entrusted to the South Manchuria Railway Company for twenty years, on condition that out of the net earnings the equivalent of 6 per cent. on the total amount of capital furnished by the government-general since the fiscal year 1911 be paid to government-general each year, and in the event of the profit gained falling short of that amount in any one year, the deficit to be made good out of the profits of succeeding years, while should the profit exceed the amount required, half such excess was also to go to the government-general. This arrangement was superceded by another contract signed on the 23rd of July, 1918, relieving the S.M.R. Company from paying over the half of any excess profit obtained, but requiring it to bear construction costs.

A new contract for three years, beginning with the 1922 fiscal year, was concluded in August, 1920, on the basis of the old one, with the provision that the S.M.R. Company should pay to the government-general the equivalent of 6 per cent. on the total amount of the capital advanced by it up to the end of the fiscal year 1920, and 4 per cent. on the capital furnished by it each subsequent year.

The following table gives some idea of the railway development:—

Fiscal Year	Length Miles	Passengers	Freight Tons	Receipts Yen
1921 ..	1,165.4	13,821,144	3,311,391	24,815,997
1920 ..	1,157.4	12,421.441	3,186,073	23,816,807
1919 ..	1,153.2	12,184,485	3,642,829	21,635,968
1910 ..	674.6	2,024,490	888,723	4,095,752

Though railway rates and charges had not been revised since 1912, the increase in expenditure owing to the rise in price of commodities at length required this to be done, but great care was taken to make them no higher than absolutely necessary.

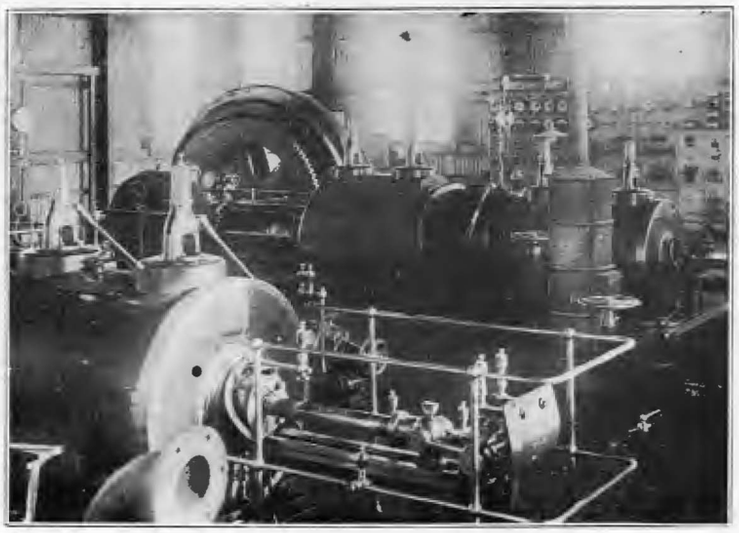


The hotel business as an adjunct to the railway business was first started at Fusan in 1912 for the convenience of foreign tourists, by making use of the upper stories of the station there, and later on, in Shingishu. In 1914, the Chosen Hotel was established on a large scale in Keijo, and branches of it at Kongozan for the convenience of sight-seers there, one at Onseiri and one at Choanji.

Warehouses were established in 1913 at Keizan and ten other places, and as time went on, were erected in other important centres. Storage yards were also prepared to copewith the prevailing congestion, and 67 points along therailways are now provided with warehouses or sheds, the number of warehouses being 58.

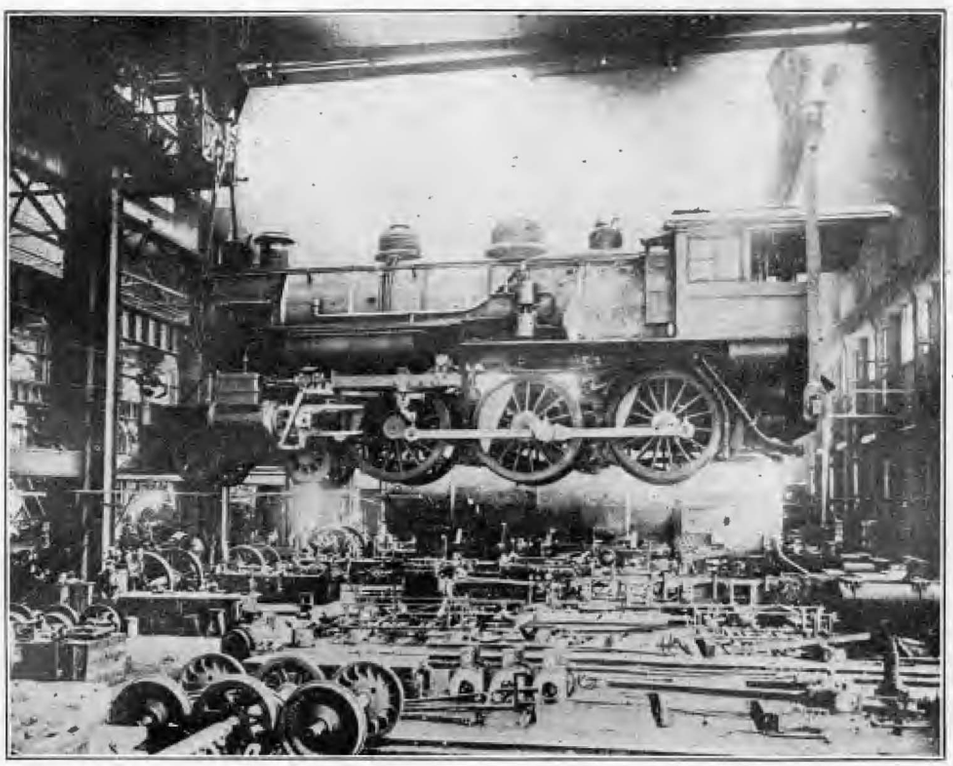
New Construction

As regards new construction and improvement of existing lines, the Kei-Fu line has been continually improved since the fiscal year 1914, while the new lines Taikyu-Kinsen and Taiden-Fuko were completed in the fiscal year 1916, and the Kinsen-Taiden in the fiscal year 1919, while the new line between Soryo and Fusan-chin and that near Keijo are now in the course of construction. The Kankyo line in the north-east between Gensan and Kwainei totals over 376 miles in length and has a branch line running between Yujo and Seishin. Of this the parts between Gensan and Eiko and Seishin and Kwainei were completed in 1916 and 1917 respectively, between Eiko and Kanko and Yujo and Ranan in 1919, between Ranan and Kyojo, in 1920, and between Kyoko and Shuotsu this fiscal year. In the west, the Heijo Colliery Railway bought the line between Birin and Shosorai from the Onoda Cement Company and opened it to traffic in 1918, and the Konan line started work on a track between Taiden and Moppo and between Riri and Gunsan in 1910, and opened both to business in 1914.



Of the lines now under construction or projected, the Kankyo line will be completed in the fiscal year 1927, the Chinkai line in the fiscal year 1925, and a double track between Keijo and Fusan and between Keijo and Shingishu will be laid, and new lines between Keijo and Koryo, and Gensan, Koryo and Fusan, started as soon as financial conditions will allow.

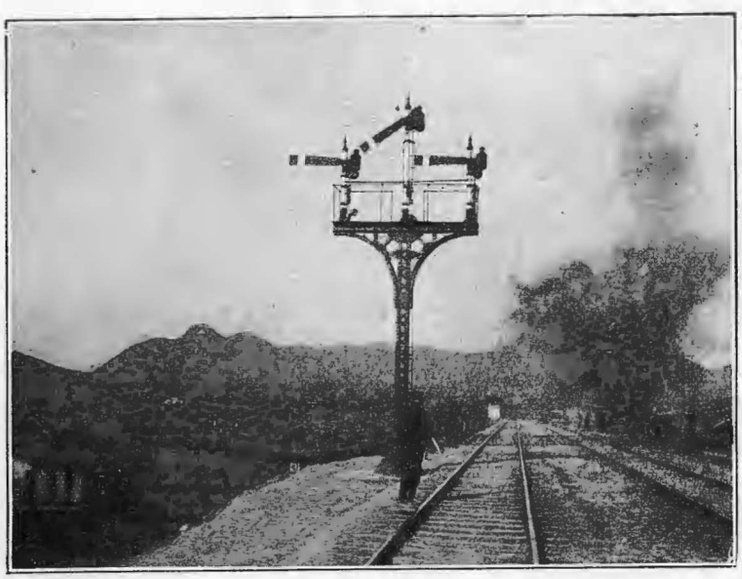
It is also planned to start construction of a line between Heijo and Kogen, 133 miles in length, at the estimated cost of Y.51,600,000 in 9 consecutive years ending in the year 1930. This line, when completed, will prove of great importance as a link in the chain of traffic connecting South Manchuria and Japan.



Private Railways in Korea

Many excellent transportation projects have been devised for opening up and exploiting the back districts of Korea and during the war several private companies sprang into existence and received concessions from the government but the subsequent slump and tightening of the money market caused most of them to go out of business, or curtail their activities.

At the height of the railway boom there were over twenty companies organized



KOREAN GOVERNMENT RAILWAYS, OPERATED BY THE S.M.R.

Ryusan Workshops, Boiler Shop

Erecting Shop

Engine Room, Ryusan Shops

Nandaimon Station Yard, Seoul

Moppo Station

to construct lines under the government guarantee. Since then, several companies have amalgamated their interests and there are now only six private lines in operation with four companies possessing charters which have not yet perfected their construction plans.

Railway Workshops at Ryuzan (top) and at Fusan (bottom)

These enterprises were the outgrowth of government regulations promulgated in 1912 for the encouragement of private railway and tramway construction, supplemented in 1914 by further provisions conceding a six per cent. subsidy to important lines in order to meet any deficiency in profit below this percentage on the paid-up capital. The subsidy was raised to seven per cent. in 1918 and to eight per cent. in September 1919. New regulations relating to the subsidies were drawn up and promulgated in 1920. As the light railway law also required revision, the Chosen private railway regulations were published in June 1920, limiting the motive power to steam and electricity and fixing the gauge as standard. These regulations also provided for an increase in capital, issue of debentures, amalgamation of companies and other important matters, so that several companies which found it difficult to finance their undertakings, were enabled to amalgamate their interests under one corporation.

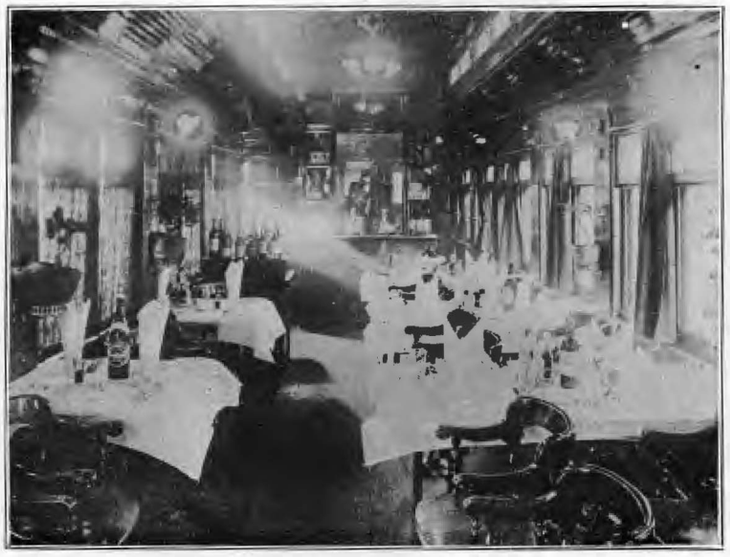
Of the six private railways now in operation, five are owned by joint-stock companies and one by a private individual, in addition to four companies which have not as yet perfected their plans. The total length of the lines in operation owned by these companies is 346 miles with 119 miles under construction and a total of 1,668 miles under charter. The combined authorized capital of these companies is Y. 73,100,000, of which Y.29,100,000 is paid up, with loans outstanding to the amount of Y.17,611,000. The government subsidy has been extended to all these joint-stock companies to the extent that if the railway fails to make an eight per cent. profit on the paid-up capital and the loans for construction purposes, the government makes good the deficiency. The government, however, limits this subsidy to fifteen years from the date of registration of the company's establishment or the date of registration for a loan or the day the loan was contracted.

Even with these encouragements the progress of new private railway construction in Korea has been slow. The private companies,

1st Class Car

Corridor of Sleeping Car

3rd Class Car



Luxurious Traveling on the S.M.R. Express through Korea: Observation and Dining Cars

Railway Bridge over the Kan River

despairing of obtaining funds in the Japanese market under present financial conditions, have placed their propositions before American bankers, while the imperial authorities and the government-general of Korea have modified their old policy and now welcome the use of loans for the completion of these much needed railways. The following summary of the private railways in Korea will give some idea of the extent and importance of their building program :—

The Chosen Railway Co., Ltd.

This company was established in September 1923 as the result of the amalgamation of the Chosen Central Railway Company with five other companies. Its authorized capital is Y.54,500,000 of which Y.17,650,000 is paid up, with loans outstanding amounting to Y. 13,650,000. The total mileage which the company has the right to build is 1,187, covering lines which extend to every province except Keiki, Chunan, Heinan and Kogen. At present, 211 miles are in operation with 101 miles under construction. The head office of the company is at Keijo with a branch in Tokyo and sub-offices in Seishu, Kinsen, Daikiu, Masan, Koshu, Sariin, Kanko and Komosam. The various lines operated are as follows :

Railway Bridge over the Yalu River

The Chuhoku Line : This standard gauge line branches off the main Korean government Keijo-Fusan railway at Chochiin and extends to Chushu via Seishu, the seat of the Chuseihoku-Do government. Its total length is 58 miles of which only the section between Chochiin and Seian (29 miles) is open for traffic.

The Zennan Line : This standard gauge line branches off the government Konan line at Shoteiri and terminates at Masan by way of Koshu where the government of the Zenra-nan-Do is located. The total length is 139 miles with only the 22.7 mile section between Shoteiri and Tanyo in operation.

The Keihoku Line : This standard gauge line branches off the main Korean government Keijo-Fusan railway at Kinsen and traversing the northern part of the Keisho-hoku-Do, terminates at Anto. The total length is 73 miles with the section between Kinsen and Eiko (38 miles) now under construction and expected to be ready for operation by the end of this year.

The Keito Line : The gauge of this line is 2-ft. 6-in. It starts at Taikiu on the main Keijo-Fusan government line and terminates at Hoko on the eastern coast. Another line branches off at Seigaku and extends to Torai by way of Urusan. There is also another section between Urusan and Choseiho. The total length of railway to be built by the company is 132 miles with two sections of 92 miles in operation between Seigaku and Urusan and between Daikiu and Kakusan. The business outlook for this line is very bright as it traverses a territory rich in agricultural resources with its terminus at the port of Hoko, one of the most important fishing centres on the eastern coast, assuring to it a large volume of profitable traffic in fishery products.

The Keinan Line : A standard gauge line starting from the terminus of the Masan line meeting the Zennan line at Kato passing through Shinshu, the seat of the Keisho Nan-Do government. For 69 miles, the Keinan line forms a part of the main line. A section between Masan and Gunhoku (18.3 miles) is open to traffic and the section between Gunhoku and Shinshu (25 miles) will soon be completed.

The Kokai Line : The projected sections of this line are as follows :

(1) 51 miles from Sariin on the Keigi line to Choto, opposite Chinnampo.
(2) 9.4 miles from Jokai to Ginzanmen.
(3) 32.4 miles from Kasan on the Ginzanmen line to Kaishu, the seat of the Kokai-Do government.

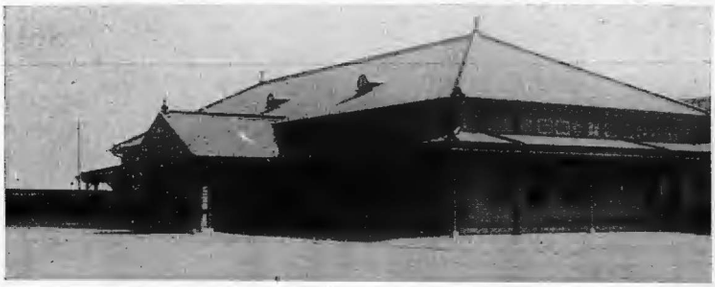
Railway Bridge over the Rakuto River

Railway Bridge over the Kin River

KOREAN STATION BUILDINGS AND HOTELS OPERATED BY THE S.M.R.

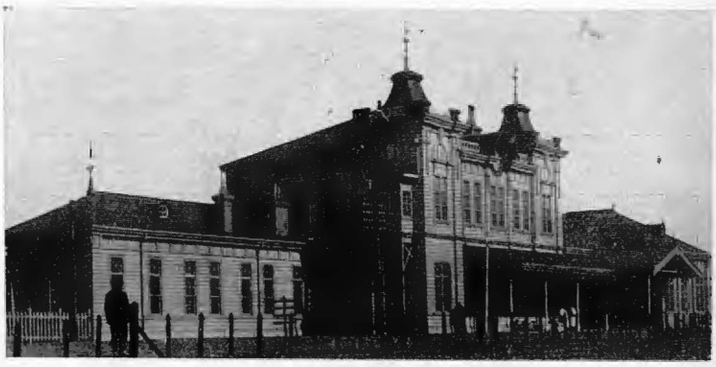
Offices of the Korean State Railways at Ryuzan, near Seoul

Ryuzan Station



Kunsan Station

Heijo Station



Taikyu Station

Shingishu Station and Hotel

(4) 3.2 miles from Shinin to Kaseimen.
(5) 47.4 miles from Shinsen on the Choto line to Ryutoho by way of Kaishu.
(6) 18.6 miles from Rihoku to Choen.

The total length is 162 miles with the sections between Sariin and Shinsen and between Jokai and Naido (31.2 miles in all) in operation. The section between Kasan and Miriki (5 miles) was opened to operation on September 1 of this year and the section between Miriki and Kaseimen (9.2 miles) is under construction. The transportation of agricultural products from the fertile plains served by the line as well as iron ore from the Ginsanmen district are the most important sources of revenue.

The Heihoku Line: A standard gauge project 77 miles in length connecting Mochuri on the Keigi line with Kisen, on which no work has been done to date.

The Kannan Line: A 2-ft. 6-in. line starting from Kanko and extending to Koshu, Koyu and Manpochin, a total distance of 218 miles. There are two branches, one from Goro-ri to Kantai-ri (53 miles) and the other from Hojo to Choho, 1.7 mile. This line is primarily intended to transport lumber from the forest districts of the upper Yalu. Choho is the terminus of the Kanko-Choho line (17.7 miles) in which district is located the Kanko coal mine which has a daily output of 100 tons, but is capable of considerable expansion with proper railway facilities to transport the coal to market.

The Chosen Hotel at Seoul, Operated under Contract by the South Manchurian Railway Company for the Korean Government Railways

The Kanhoku Line: This line, also of 2-ft. 6-in. gauge, like the Kannan line, was designed to transport timber from the upper Tumen River district. Starting from Kichishu, it will proceed to Keisanchin a distance of 205 miles. A branch is to start from Gosui and end at Komosan on the Seikai line. At present, the 24-mile section between Komosan and Shintan is under construction.

FUSAN, THE GATEWAY TO KOREA

General View of the Port of Fusan, Showing Location of Railway and Steamship Wharf

The Chosen Keinan Railway Co., Ltd.

The authorized capital of this company is Y.10,000,000, half paid up and with loans outstanding to the amount of Y.2,100,000. The head office is located at Ten-an on the main Keijo-Fusan government railway. The line starts from the other side of Gunsan and extends to Anjo in Keiki-do by way of Tenan, a distance of 99 miles. The section between Ten-an and Kosan (46.8 miles) has been completed and is now in operation. The line is standard gauge.

Fusan Pier

Showing Direct Connection Between Rail and Steamship

The Zenhoku Railway Co., Ltd.

This company with its head offices at Zenshu, the seat of the Zenra Hoku-Do government; has an authorized capital of Y.600,000 of which Y.450,000 is paid up and a loan amounting to Y.60,805 outstanding. The line, 2-ft. 6-in. gauge, is in operation on the section between Riri on the Konan line and Zenshu, a distance of 15½ miles. There is a vast stretch of rich agricultural land in the district served, contributing a very profitable goods and passenger traffic, enabling the company to pay more than eight per cent. dividends without the help of the subsidy. The business outlook for this line is very bright.

Station Hotel at Fusan Terminus of the Korean Railways

The Tumen Railway Co., Ltd.

The head office of this company is in Tokyo with the

Mokpo, an open port on the South-Western Coast of Korea, the terminus of the Government Kanan Line

Masanpo, a port on Chinhai Bay, 55 miles west of Fusan, terminus of the Government Railway

operating office in Kainei. It has a capital of Y.3,000,000 all paid up with an outstanding loan of Y.100,000. Of the projected 57 miles of lines, a section of 31.5 miles between Kainei (on the Seikai line and Shojo) is now operating and the section between Shojo and Shokanchin (5½ miles) under construction. When all the line is completed it will be utilized for the transportation of agricultural produce from the Kanto district. The Chinese Tento railway having been recently opened to traffic, it is expected that the volume of business over the Tumen line will be greatly increased. To facilitate means of transportation in the district the Tumen railway company is operating motor cars between Shojo, Onjo and Keigen.

The Kongosan Electric Railway, Ltd.

The head office of this company is located at Tetsugen, in Kogen-Do. Its authorized capital is Y.5,000,000 with Y.3,000,000 paid up and a loan outstanding amounting to Y.4,200,000, in which the fund for subsidiary undertakings is included. The company has erected a hydro-electric plant at Kasen, in Kogen-Do and is constructing an electric standard gauge railway 63 miles long, connecting Tetsugen with Kasen near Kongo-san and supplying electricity to the towns along the line. The section between Tetsugan and Kinka (18 miles) is completed and the necessary electric equipment was ordered from Japan. Due to the destruction of this equipment during the quake and fire of last year, its delivery has been delayed. In the meantime the company is operating steam locomotives to haul its trains over the open section. A summary of the equipment for this line is given further on.

Kunsan, a busy Rice Port on the Western Coast of Korea, served by the Government Kanan Line and the Chosen Keinan Railway

The Kaisen Light Railway

This 2-ft. 6-in. gauge line is owned and operated by a private individual, Mr. Masanobu Tannowa. It is 23 miles long connecting Shin-Anshu (on the Kaigi line) with Sendo via Kaisen. This line was originally built for the exclusive transportation of iron ore for the Hokkaido steel company but owing to the gradual increase of passenger and goods

The Port of Gensan, the Principal Port on the Eastern Coast of Korea

The Town of Yeiko, near Gensan

traffic along the line it was turned over for the public use. It is operated for the present without the subsidy.

Other Railways

In addition to the above lines, the following four companies have been incorporated but have not yet completed their construction plans:—The Hokusen Railway Company, The Hokusen Kogyo Railway Company, The Keishun Electric Railway Company, and the Chosen Keito Railway. The projected length of the Hokusen railway is 85 miles connecting Rashin in Kankyo-Hoku-Do with Kunju. The section between Kainei and Kindo (46½ miles) will be operated by the Hokusen Kogyo Railway Company and the section between Suigen (Keikido) and Reishu (43.1 miles) by the Chosen Keito Railway. These lines are all of standard gauge. The Keishun Electric Railway Company have been granted a charter to build and operate a 3-ft. 6-in. electric line between Keijo and Shunsen a distance of 49.6 miles, but the company is not yet officially established.

Summary of Private Railway Statistics

Zenhoku Railway Company

Head Office, Zenhsu: *Capital, authorized*, Yen 600,000, *paid up*, Yen 450,000, *loans*, Yen 60,805: *Construction costs*, Yen 510,326: *Gauge*, 2′6″: *Locomotives*, 6: *Passenger cars*, 14: Covered wagons, 21: Open trucks, 32: Section operated, Riri-Zenshu, 15.5 miles: No. of trains, 6: Number of passengers, 424,873: Freight, 64,738 tons: Revenue, Yen 261,543: Expenditures Yen 204,926: Profit, Yen 56,617: Government subsidy, none.

Tumen Railway Company

Head Office, Tokyo: *Capital, authorized*, Yen 3,000,000, *paid up*, all, *loans*, Yen 100,000: *Construction costs*, Yen 2,987,819: *Gauge*, 2′6″: *Locomotives*, 8: *Passenger cars*, 10: Covered wagons, 55: Open trucks, 35: Subsidiary undertakings, Motor car transportation from Shojo to, Keigen and Onjo. Sections operated, Kainei-Shojo: Mileage, 31.5: Number of Trains, 3: No. of passengers, 109,011: Freight, 80,284 tons: Revenue, Yen 526,706: Expenditures, Yen 313,608: Profit, Yen 213,098: Government subsidy, Yen 85,780.

Chosen Keinan Railway

Head Office, Ten-an: *Capital, authorized*, Yen 10,000,000, *paid up*, Yen 5,000,000, *loans*, Yen 2,250,000: *Construction expenses*, Yen 6,154,861: *Gauge*, 4′8½″: *Locomotives*, 4: *Passenger Cars*, 6: Covered wagons, 2: Open trucks, 50: Sections operated, Ten-an to Kosen: Mileage, 46.8: Number of trains, 3: No. of passengers, 227,222: Freight, 77,730 tons: Revenue, Yen 284,242: Expenditures, Yen 228,759: Profit, Yen 55,483: Government subsidy, Yen 422,339.

Kaisen Light Railway

Head Office, Gunguri: *Capital, authorized*, Yen 792,500: *Construction expenses*, Yen 798,500: *Gauge*, 2′6″: *Locomotives*, 6: *Passenger Cars*, 8: Covered wagons, 6: Open trucks, 74: Setcions operated, Shinanshu-Kaisen-Sendo: Mileage, 23: No. of trains, 4: No. of passengers, 107,781: Freight, 75,761 tons: Revenue, Yen 128,138: Expenditures, Yen 120,710: Profits, Yen 7,428: Government subsidy, none.

Chosen Railway

Head Office, Keijo (Seoul): *Capital, authorized*, Yen 54,500,000, *paid up*, Yen 17,650,000, *loans*, Yen 13,150,000: *Construction expenses*, Yen 29,369,178: *Gauge*, 2′6″ and standard: *Locomotives*, narrow gauge, 22, standard gauge, 8: *Passenger cars*, n.g., 84, s.g., 14: Covered wagons, n.g., 125, s.g. 13: Open trucks, n.g., 264, s.g., 28: Subsidiary undertakings, warehouses, and hot springs at Shinsen and hotel at Bukkokuji: Sections operated, Narrow Gauge lines, *Keito Line*, Daikyu-Hoko-Kakusan, 4 and 3 trains daily: Seigaku-Urusan, 92 miles. *Kokai Line*, Sariin-Shinsen and Naido-Jokai, 4 and 2 trains daily: 31.2 miles: *Kannan Line*, Kanko-Goro-Choho, 17.7 miles, 4 and 3 trains daily. Standard Gauge lines: *Keinan Line*, Masan-Gunhoku, 18.3 miles, 4 trains daily: *Zennan Line*, Shoteiri-Tanyo, 22. 7 miles, 7 trains daily: *Chuhouk Line*, Chochiin Seian, 29 miles, 4 trains daily. Number of passengers, 1,380,573: Freight, 266,435 tons: Revenue, Yen 1,333,467, Expenditures, Yen 1,149,472: Profits, Yen 183,995: Government subsidy, Yen 1,835,878.

Note.—The railway fare is five sen per mile and first class eight sen. Freight is charged one sen per mile per 100 *kin* for light articles and 13 sen per ton for bulky goods, with a charge of ten sen per mile per ton for hired cars.

Electric Railways and Tramways

The Kongo-San Electric Railway

The power for operating this line will be obtained from the Kasen River one of the tributaries of the upper Kan, at a point 1,600 *shaku* above the level of the sea. Here a large reservoir has been created by damming the Kasen River with a stone dam faced with concrete 88 *shaku* high, 61 *shaku* at the bottom and 12 *shaku* at the top. The capacity of this reservoir is about 400,000,000 cubic feet, assuring a steady volume of 142 cubic feet at all seasons with a head of 773 *shaku* for operating the Number 1 power house of 6,900 k.w. capacity. Two smaller plants will be erected lower down the stream to be called the No. 2 and No. 3 power houses, the first to have a capacity of 3,400 k.w. with a head of 400 *shaku* and the other of 1,800 k.w. capacity with a head of 209 *shaku*. There is also a small steam plant generating 300 k.w., making a total power capacity of 12,400 k.w. which the company will develop as the demand for power and light requires. Equipment for generating 3,200 k.w. at the No. 1 power house was installed by November of last year and by the end of the present year the remaining equipment for operating the full capacity of the plant will be in place.

The head-gate is located about a mile lower than the reservoir. A concrete weir has been built at this place. The head race, 4,800 *shaku* long, was cut for the most part through solid rock and finished with concrete. The gradient between the head-gate and the pressure tank is 5 *shaku* giving a volume of 185 *shaku* per second. From the pressure tank the water is conveyed to the power house through two lines of flanged riveted steel pipes.

The No. 1 power house is a brick building divided into two parts. The first is a one-storied building 58 by 48 *shaku* housing the engine room and the other a two-storied building with the transformer room on the ground and the switchboard and distributing apparatus on the second. The machinery consists of one 4,600 h.p. water turbine driving a 4,063 k.v.a., 6,600 volt alternator at 514 r.p.m. and one 5,300 h.p. turbine driving a 4,700 k.v.a., 6,600 volt at 450 r.p.m. The exciter for the first set is 45 k.w., 124 volt and for the second set, 50 k.w., 125 volts. Four transformers (one in reserve) of 1,375 k.v.a. each and another set of four (one spare) of 1,600 k.v.a. raises the primary pressure of 6,000 volts to 66,000 volts.

The transmission lines from No. 1 power house to the Dojori sub-station (52 miles) are carried on iron towers. Between Dojori and the Tetsugen transformer station (5 miles) wooden poles are used. Iron towers and wooden poles are used to carry the transmission line between Dojori and the Keijo transformer station (50 miles), a total distance of 102 miles from the power house to the capital. A large amount of the current already generated is being used in Keijo, for commercial light and power. The iron towers are of mild galvanized steel 68′ to 70′ in height, the standard distance between towers being 600 *shaku* and the maximum distance, 842 *shaku*. Six overhead wires (three wires not yet strung) and one underground wire are laid. Larch poles 35 *shaku* and 55 *shaku* in length and .7 *shaku* diameter at the top are also used either singly or the shape of a triangle, the standard distance between each being 150 *shaku* and the maximum, 780 *shaku*. Three overhead and one underground wire are laid.

The wires are of hard drawn copper, No. 12 B.S. the distance between each being 7 feet. Transformer stations are located at Keijo and Tetsugen. The railway starts from Tetsugen station on the Keijo-Gensan main line and proceeds to Kasen via Kinka, Kinjo, Shodo and Shinan, a total distance of 63 miles. Kongo-san lies about 20 miles to the west of Kasen, the terminus of the line. The section between Tetsugen and Kinka (18 miles) was opened to traffic on August 1st of this year and the section between Kinka and Kinjo (14 miles) now under construction, will be completed next year.

1 *shaku*—0.994194 feet.

The line is standard gauge, single track, laid with 60-lbs. rails. The overhead line is of No. 30 hard-drawn copper wire. single trolley, catenary system using 1,500 volts d.c. The passenger cars are of the bogie type 45 *shaku* long over-all equipped with four 70 h.p. motors each capable of drawing a 30-ton goods wagon on a ruling gradient of one in forty. The cars are equipped with pantagraph, Westinghouse air-brakes and electric radiators. There are three cities in Korea where tramways are now in operation.

THE KEIJO ELECTRIC TRAMWAY COMPANY, LTD: The head office of this company is in Tokyo with its operating office in Keijo (Seoul). Besides operating the tramway the company also supples electric light and power and gas. The length of open lines is 18.9 miles, that is, 9.9 miles of double track and 9 miles of single track section. The company is preparing to extend its lines to keep pace with the construction of new roads in the city. The line is a single trolley system with the power supplied from the company's own plant. The cars are operated from 5.30 a.m. until 1 a.m. and in the city districts there is a car every two to seven minutes, in the suburban districts, every nine minutes.

Capital, authorized, Yen 15,000,000, paid up, 10,000,000: Construction costs, Yen 3,352,339: Gauge, 3'6": Cars, 123: No. of daily passengers per mile, 561: Passengers carried, 33,105,468: Fare, average, 5 sen: Revenue, Yen 1,614,478: Expenditures, Yen 1,021,974: Profits, Yen 592,504.

THE HEIJO ELECTRIC TRAMWAY: This tramway is owned and operated by the Heijo prefectural government. It is double tracked 2.8 miles long of the single trolley system receiving its power from the plant of the Chosen Electric Industrial Company. Operating hours are from 4 a.m. to 1 a.m. with intervals of six to eight minutes between cars.

Head Office, Heijo: Capital, Yen 480,000: Paid-up, Yen 480,000: Construction costs, Yen 480,000: Gauge, 3'6": Cars, 10: Miles operated, 2.8.: No. of daily passengers per mile, 388: No. of passengers, 2,307,807: Fare, 5 sen per section—two sections: Revenue, Yen 112,549: Expenditures, Yen 73,442: Profits, Yen 39,107.

THE FUSAN ELECTRIC TRAMWAY: This tramway is owned and operated by the Chosen Gas and Electric Company, Ltd., whose head office is in Tokyo and operating office in Fusan. Besides operating the tramway the company also supplies electric light and power and gas. The line is of single track, but double tracks are now being laid in the urban districts. It is of the single trolley system with the power supplied from the company's own plant.

Capital authorized, Yen 3,000,000, paid-up, Yen 2,700,000, loans outstanding, 530,000: Construction costs, Yen 671,260: Gauge, 2'6": Cars, 15: Miles operated, 10.7: No. of passengers per mile per day, 133: Total passengers, 4.400,758: Fares, 5 sen per section (6 sections), Revenue, Yen 273,828: Expenditures, Yen 199,198: Profits, Yen 74,630.

Tokyo's Electric Light and Power Supply

THE damage to electric lights and decrease in the consumption of power in and around the city of Tokyo, as a result of the quake in September, 1923, has been practically restored to former conditions.

Up to 80 per cent. of the total electric light and power consumption in Tokyo has been covered by the Tokyo Electric Light Company, Ltd. (Tokyo Dento Kabushiki Kaisha), and the remaining 20 per cent. by the Denki-kyoku or the electric bureau of the Tokyo municipality. For several years past the number of electric lights and power supply has been increasing at a rate of 15 per cent. a year. The capacity of the Tokyo Electric Light Co. and the municipal electric bureau, too, has been proportionately extended, accordingly.

At the end of August, 1923, the Tokyo Electric Light Company was supplying current for 3,180,202 lights in and around the city of Tokyo, and the municipal electric bureau for 721,900 lights, a total of 3,902,102, which decreased to 2,153,815, as will be seen in the following table :—

COMPARISON OF ELECTRIC LIGHTS IN THE TOKYO DISTRICT BEFORE AND AFTER THE EARTHQUAKE, AND THE RECENT RECOVERY.

MONTHS	TOKYO DENTO	DENKI-KYOKU
End of Aug. (1923)	3,180,202	721,900
Immediately after quake	1,587,015	566,800
End of Sept.	1,589,508	572,060
Do. Oct.	1,637,056	597,884
Do. Nov.	1,845,941	613,158
Do. Dec.	1,953,289	641,520
Do. Jan. (1924)	2,090,046	654,593
Do. Feb.	2,173,379	663,910
Do. March	2,244,639	678,084
Do. April	2,326,567	691,663
Do. May	2,370,433	702,676

The number of lights has registered a steady increase, reaching 3,073,109 at the end of May, 1924, a decrease of 900,000 lights in round figures.

On looking over the foregoing table, one finds that the decrease in the number of lights furnished by the Tokyo Electric Light Co., is considerably larger than that of the Tokyo municipal electric bureau in percentage, due mainly to the fact that the company had a large number of down-town customers, while the electric bureau had been furnishing more light in the residential districts, where the damage was not half so severe.

The aggregate total supply of the electric power in and around the city of Tokyo amounted to 248,406 k.w., at the end of August, 1924, dropping to 166,641 k.w., immediately after the quake. The Tokyo Electric Light Company lost about 80,000 k.w., and the Tokyo municipal electric bureau, about 100,000 k.w. but as in the electric light supply, the power consumption has also developed a steady increase.

ELECTRIC POWER CONSUMPTION

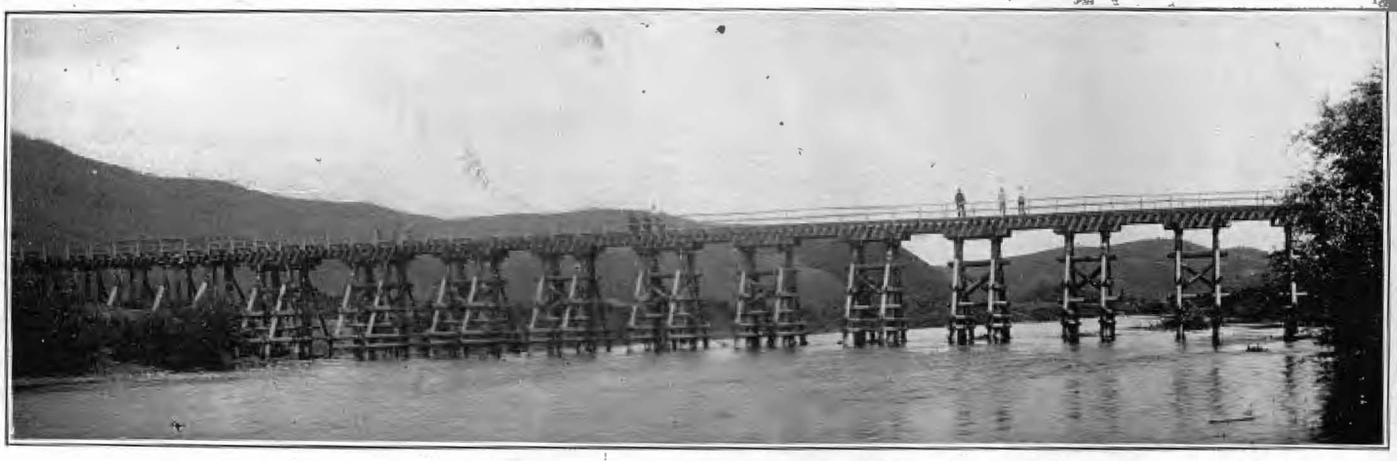
MONTHS	TOKYO DENTO	DENKI-KYOKU
End of Aug., 1923	222,010 k.w.	26,396 k.w.
Immediately after the earthquake	149,776	16,865
End of Sept.	149,837	16,774
Do. Oct.	150,928	17,056
Do. Nov.	155,884	17,502
Do. Dec.	167,438	19,190
Do. Jan., 1924	178,288	20,355
Do. Feb.	186,599	21,514
Do. March	193,931	21,558
Do. April	199,910	22,157
Do. May	206,740	22,856

In the electric power supply, the Tokyo Electric Light Co., Ltd., has recovered 80 per cent., and the electric bureau about 70 per cent. The generating capacity of both sources of supply having been restored to pre-quake conditions, the consumption is expected to reach former conditions before the end of this year.

The Tokyo Electric Light Company is now erecting an electric bulb factory at Osaki-machi, a suburb of Tokyo, to be completed some time this autumn, that will turn out 2,000,000 electric bulbs annually. This, together with the 1,000,000 bulbs produced annually at the Honjo factory of the company, will be sufficient to cover the annual demand of the company.

The Tokyo Electric Light Company has been receiving its entire supply of bulbs from several companies, but since the opening of the Honjo factory, has been nearly able to meet its own requirements.

It is announced that the Bombay Port Trust have accepted the tender of Sir. W. G. Armstrong Whitworth & Co., Ltd., for a steel floating caisson for the entrance to the Merewether Dry Dock, Bombay. The caisson will be constructed at the firm's Walker Shipyard, Newcastle-on-Tyne.



390-ft. Timber Bridge Across River Maihe at Imienpo

Lumbering in North Manchuria

Trials and Tribulations in the V. F. Kovalsky Concession Developments

DEVELOPMENT of the lumber industry of North Manchuria has been retarded from social, political and economic causes. It is slowly breaking through the crust of these influences and bids fair to become a factor in the world's lumber production. It is a country with large potential lumbering possibilities. An interesting prospectus showing the timber concessions of V. F. Kovalsky, in North Manchuria, with head offices in Harbin, China, has been issued. The prospectus is printed in three languages—Russian, English and Japanese. It is well illustrated. The prospectus was issued to commemorate the 25th anniversary of the construction and operation of the Chinese Eastern Railway. The description of this pioneer lumber enterprise is illuminative of the tribulations encountered in the development of the North Manchurian lumber business. It is quite similar in many respects to the early development of the lumber industry of the United States, and especially of the Pacific Coast, British Columbia and other sections of the world.

The Timberman takes pleasure in reproducing the prospectus and also some of the pictures illustrating this Manchurian lumber enterprise.

The timber concessions, six in number, cover a general area of more than 5,000 square versts (2,200 square miles), located on both sides of the eastern line of the Chinese Eastern Railway, within 44 degrees 25 min. and 45 degrees 35 min. north latitude and from 128 degrees to 130 degrees 20 min. east longitude, and extending along the Chinese Eastern Railway from the Yakuni siding to Mulin station.

The above mentioned general surface area is divided into separate concessions as follows:

Concessions 1 and 2.

Concession Yablonia about 2,420 square versts (1,060 square miles).

Concession Imienpo about 450 square versts (105 square miles).

Concession Hailin about 650 square versts (285 square miles).

Concession Handachetze about 380 square versts (165 square miles).

Concession Mulin about 1,500 square versts (660 square miles).

Total—5,400 versts (2,275 square miles).

The rights of the firm in respect to all concessions are based on contracts, registered with the Chinese authorities.

On all concessions there is a total stand of timber, mostly cedar, of about one billion cubic feet.

The predominant tree species are cedar, fir, larch, oak, velvet tree, elm, etc.

The main lumber requirements constitute: (*a*) Chinese Eastern Railway: firewood and sleepers. (*b*) Export: Squared cedar logs, sawn materials, aspen logs for match manufacturing, hardwood veneer logs and mining timbers.

In addition to navigable rivers the concessions have at their disposal the following means for transportation of timber:—

94 versts (41 miles) narrow-gauge light track.

25 versts (11 miles) broad-gauge railway lines.

8 versts (3.5 miles) cableways.

250 versts (110 miles) common roads.

The firm possesses its own rolling stock, 70 open truck cars of a loading capacity of 700 poods (25,000 pounds) each. Loading and unloading is performed by cranes and other mechanical equipment.

A sawmill with seven frames and several working lathes is located at the Yablonia concession, with a yearly output of 3,000,000 cubic feet.

In the course of the operation of the concession permanent dwelling quarters (brick-built or hewn from beams) have been constructed with a floor space of about 1,200 square sagenes (58,800 square feet) and temporary premises, huts, barracks, mud-huts, aggregating about 4,000 square sagenes (196,000 square feet).

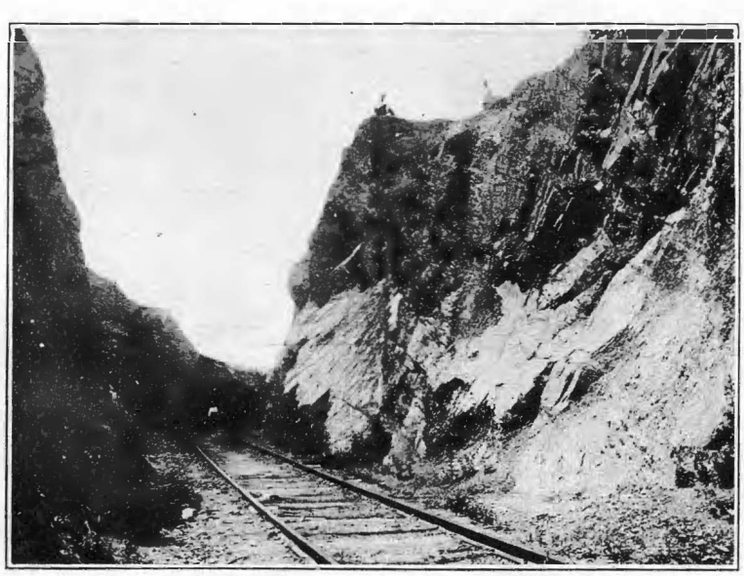
During the period of the operation of the concessions the firm has expended:

(*a*) For the construction of railway lines (exclusive of the cost of rails and rolling stock), narrow gauge, light track, cableways and common roads, 800,000 gold roubles ($416,000).

(*b*) For repairs, maintenance and protection of the above roads, more than 270,000 gold roubles ($140,000).

(*c*) For construction, repairs, maintenance, protection and insurance of dwelling premises with offices, about 315,000 gold roubles ($164,000).

(*d*) For installation and equipment of sawmills, about 280,000 gold roubles ($145,000).



20 Metre Cutting on Concession Railway Line Near Imienpo

Log Jam on Liantzshe River Just Before it was Broken

Train on Concession Tracks Ready to Leave for Mill

(e) For operating expenses of all the concessions 8,435,000 gold roubles ($4,385,000) have been disbursed, subdivided as follows: To workmen and cost of carts 5,391,000 gold roubles (2,805,000). Stump taxes, duties, taxes and sundry fees to the Chinese treasury, 1,232,000 gold roubles ($640,000), and 1,812,000 gold roubles ($942,000) for various general expenses, management, losses from fires, compensation for accidents, salaries, wages, gratuities, etc.

The total amount expended in the course of operation has been about 10,100,000 gold roubles ($5,252,000).

The number of workmen employed on the concessions yearly fluctuated between 2,000 and 8,000 men, and the number of salaried employes between 400 and 300 men.

At present the different enterprises of the firm employ, exclusive of the staff in the offices, consisting of one construction engineer, four trained forest keepers, one legal counsel, four mechanical engineers, five commercial correspondents and seven interpreters for Chinese, Japanese and English business.

The main concession, Yablonia, is provided with a gymnasium, school, library and reading room; besides newspapers and periodicals are subscribed for all concessions for the benefit of the employes.

The importance of the enterprises and the activity of the firm in the region of its nearest influence can be characterized by the following data:

The territory, which is served by all the roads constructed by the firm, measures about 20,000 square versts (8,800 square miles).

The population of the territory consisted before the concession period mostly of hunters and vagrant elements and amounted to only 20,000 or 30,000 individuals, mostly men, whereas at the present moment the population is over one million persons, including women and children.

Logs on the Up Grade

Up to the inauguration of Kovalsky enterprises this country was almost a desert and now it is colonized exclusively by Chinese. Originally they engaged as workmen for various forest work, and later, having earned and saved a certain amount, they acquire livestock and inventories, settle down on vacant lots of land, and being to some extent protected from hunhutze raids in the neighborhood of the concessions, engage in farming, which represents the chief occupation of the settlers. During winter and at such times when not occupied by farming they work on the timber concessions, thereby making substantial extra earnings.

According to information gathered by the firm of V. F. Kovalsky, the production of the above named territories, gathered from its fields in 1921, comprised: Ten million poods (360,000,000 pounds) of cereals, beans, kaoliang, kutza, wheat, buckwheat, barely, corn, paitza, rice, mitza, and about 1,000,000 poods (36,000,000 pounds) of special plants used for technical purposes, including hemp, indigo, tobacco, poppy, etc., in addition to the products of gardening, cattle breeding and poultry raising.

From this data one may judge the benefits the timber enterprise of this firm has confirmed upon the whole region in a comparatively short period. The material and economic progress of the territory, which was previously a desert wilderness, is due not only to the united management of the firm's staff, but also to the far-sighted assistance rendered by the Chinese Eastern Railway, skilfully directed by a single will, and to the energy and efforts of the railway employes.

Loading Cars for the Cableway at Hantaohetze

Waiting for the Cable Log Train up the Hill at Hantaohetze

The Sawmill at Yablonia

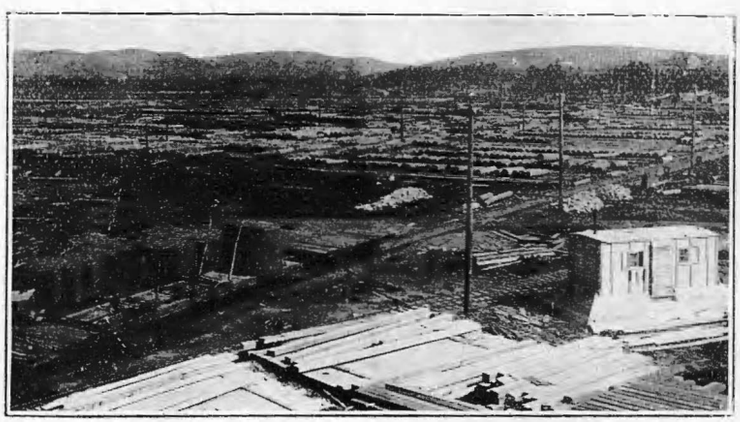
General Layout of Yablonia

The development of the firm of V. F. Kovalsky is closely connected with the history of the Manchurian timber industry in general and with its origin and evolution up to the present time, the Chinese Eastern Railway and extending along its eastern line.

The history of this industry may be divided into four periods, which may be generally characterized as follows:

The first period extends from the beginning of the construction of the Chinese Eastern Railway up to the beginning of operations on the first of July, 1903.

Prior to the construction of the railway the immense neighboring forest zone, being of the same extent as the kingdom of Belgium, was an absolutely wild desert and marshy country. Bogs were predominant, even on the steep slopes of hills, without any population, lacking roads and only crossed by hunters' tracks.



Products Stacked Ready for Shipment from Yublonia Yard

Human habitations were rare, consisting of wretched mud huts, hastily erected from brushwood and covered with mud, with unglazed windows and inhabitated by hunhutzes and half-savage huntsmen. Still more rarely in the impassable forest, generally along the river valleys, one might have found meadows covered with high, dense grass, concealing traces of villages destroyed or burnt by hunhutzes. These are the traces of the colonization policy of the government, persistently carried out during a long number of years, and which always experienced setbacks, because of the absence of roads and the remoteness of the territory from large centres.

It was only natural that in such a country the first work carried out by the constructors of the Chinese Eastern Railway was forest work, cutting trails for temporary cart roads, clearing land for settlement, providing fire wood for the severe Manchurian winter and producing beams for dwelling houses, bridges, telegraph poles, sleepers, joists, planks and other materials for the enormous requirements of the Chinese Eastern Railway under construction.

The whole railroad system was inspired by the genius of Mr. S. J. Witte, who was the chief organizer of the Chinese Eastern Railway through Manchuria, and who chose for the exceptionally responsible post of chief engineer and leader of the peaceful policy, Mr. A. J. Yugovich, a man with vast experience, good sense, firmness of character, with American resourcefulness and without the bureaucratic routine principles, which were peculiar to many eminent constructors of Russian railways in those days.

Eighteen months had hardly passed since the beginning of the work when an important part of the territory of the Chinese Eastern line, about 300 versts (200 miles) was covered with stores of beams, sleepers, joists, planks, firewood and telegraph poles. However, such preparation for timber were made exclusively for the construction requirements of the railway and therefore were not of any industrial importance. Later, when the track had been laid from Harbin to Shitouhetze, at the end of the year 1899, private contractors began gradually, and for their own account, to start logging operations and to transport timber materials and firewood to Harbin. However, the Boxer movement of the year 1900 stopped this work and for almost two whole years drove out private initiative and capital, which had already begun to come in from Russia.

After the liquidation of the Boxer insurrection logging operations again rapidly developed, though they continued to be almost exclusively carried forward for the requirements of the Chinese Eastern Railway and at its expense.

After the opening of regular traffic on the Chinese Eastern Railway on the first of July, 1903, logging operations by the railway were discontinued, with the view of ascertaining the exact yearly requirements of the railway for firewood and various timber materials. The plan contemplated the introduction of regular timber exploitation in the future and to attract big contractors who should work with their own capital and their technical staff and resources. However, the timber industry, which had just started again, was stopped in its development by the Russo-Japanese war, and soon fell into a chaotic state. A great many people quickly enriched themselves on timber deliveries to the railway and particularly to the war department and afterwards lost very quickly what they had gained, and were ruined. This period of feverish activity in logging operations called forth by the war, the gradual decline of this industry and its almost complete standstill, excepting a few insignificant deliveries to the railway, lasted about five or six years and did not give any positive results in the development and strengthening of the timber industry along the eastern line of the Chinese Eastern Railway.

The third period is the history of the timber of North Manchuria began with a slow and at times irregular influx of private capital, which soon increased and grew stronger in spite of many unfavorable circumstances, the promoters and the capital being almost entirely Russian. During the construction of the Chinese railway and especially during the Russo-Japanese war, all the forests near the railway and the best stands of cedar, velvet, oak and nut trees, were logged out for a considerable distance from the railway, and the concessionaries were obliged to expend a lot of time, energy and money for the exploration of new forest zones, prospecting and laying new and extensive railway lines, with high mountain crossings, construction of dwelling houses for employes on a large scale in uninhabited and desert districts, the organization of storehouses containing articles of daily need, the transportation of large parties of workmen and for many other requirements. General expenses and overhead charges grew accordingly, as well as the wages to the workmen. On the other hand, the Chinese Eastern Railway remained the chief purchasers of timber material, and being a commercial enterprise the railway obviously was not obliged to

consider the profits of the contractors and, therefore, in competitive biddings the railway sometimes fixed the purchase price below the cost of production.

Up to the years 1913-1914 the demand for timber materials had been quite insignificant in the local market. The money market was an extremely poor one and for this reason it was difficult to obtain longterm credit for logging operations and only granted at an exorbitant rate of interest and for small amounts. The insufficient protection against hunhutzes, especially in forest and hilly districts, remoteness from the railway, increased the difficulty of insurance of property and timber stores against fire and of employes against accidents. Insurance was either impossible or too expensive.

All these unfavorable circumstances greatly hindered the maintenance and development of the business, and therefore not only was there an absence of an influx of new funds or progress in the timber business, but many strong, private contractors were ruined. An export of timber to England gradually began to be organized in the years 1909-1914 and the prospects for big sales were very alluring, but the shortage of sea tonnage and the danger of the blockade put a complete stop to this venture in the first year of the great war.

The increased building activity in Harbin and along the Chinese Eastern Railway as well as the building activity among Russian refugees, with a large influx of gold brought from Russia, which began with the great war, tended temporarily and irregularly to increase the demand for timber. However, all this revenue brought by the war and the revolution in Russia, was soon more than offset by the tremendous losses from the depreciation of Russian currency and its subsequent complete abolition.

All the above shows that the timber industry in North Manchuria had inevitably to enter the new period, the fourth in its existence, a period of more quietly planned work with steady and increasing export and intensification of the production of dressed timber.

The previous period must be taken as a preliminary to the establishment of normal work. The time must be entirely forgotten when all lumber work was carried out by manual labor and only rough materials were produced, when even big firms could start without any steady basis, the local market possessing neither available funds, technical staff, apparatus or qualified workmen; when everything had to be imported from far away Russia, or for Russia's account from Germany or America, when China, at her own risk, was obliged to import big parties of workmen, often losing the advances paid to them. Owing to the remoteness from industrial centers the ordering of machinery and its erection were extremely expensive in view of the absence of skilled mechanics. The delivery of machinery delayed the work for indefinitely long periods, and very often such ventures ended in failure.

The prices on timber products were also subject to violent fluctuations, the price of one cw. saqeuer (343 cubic feet) of firewood fluctuated between 12 gold roubles ($6.25) and 50 gold roubles ($26), and sleepers from 60 kopecs (31 cents) to two gold roubles and 25 kopecs ($1.15) per piece.

During the last lumbering season, the winter of 1922-23, the firm executed all orders from the Chinese Eastern Railway and prepared all necessary timber material for the local market, and it is likewise in a position to fulfill all such requirements. However, taking into consideration the yearly decreasing demand of the Chinese Eastern Railway and of the local market, the firm of V. F. Kovalsky, after investigation of the foreign markets, has been exporting timber since 1912 to Japanese and Chinese markets and the South Manchuria Railway. The scope of this business has always been determined by internal and foreign political circumstances and by the conditions of traffic.

The important increase of export and the very profitable sale of timber to remote foreign markets are especially due to the favorable political conditions, as the chief supplier of timber in the world—Russia—will not soon be able to export, whereas the supplies of Manchurian timber, particularly on the concessions of V. G. Kovalsky, are very large.

At the beginning of this article is indicated the area of the forests. The Mulin concession has been acquired only recently, and therefore lacks railways. For this reason it will not be taken into consideration in the subsequent calculation. The other concessions already provided with tracks, dwelling houses, storehouses, fire-prevention equipment and accessories, arrangements for loading and unloading, workshops and mills, possess a reserve of timber calculated at over 850,000,000 cubic feet, which would yield a yearly output of about 34,000,000 cubic feet, with a turnover in 25 years.

Proposing, as in former years, to produce not less than 30,000 cw. sagenes (10,290,000 cubic feet) of firewood and 50,000 cubic feet of sawn timber for Harbin and Fuchiatien, and for export, besides about 3,000,000 cubic feet sawn material from seven timber-sawing frames, the firm still retains an enormous quantity of timber.

An equally considerable timber reserve remains on the Mulin concession in addition to the reserves of aspen, alder, birches, etc., which have not been included herein.

Taking into consideration this enormous timber supply and the development of its exports, the firm realizes the inevitable necessity of abandoning the raw material industry for manufacturing, and therefore intends to open the following industrial enterprises:

A factory to produce glued veneer, with a yearly output of 30,000,000 cubic feet, manufactured from aspen, birch, oak and velvet wood.

A match block factory, using aspen wood, with a yearly output of 500,000 cubic feet.

Russian Far East Timber

The Far East Land Authority, after investigation, estimates that with the exception of the forest land alienated to the Buryat-Mongolia republic (amounting to five and a half million dessiatins), a total of 82,399,000 dessiatins of timber lands remain in the far Eastern government. (The dessiatin is equivalent to 117,600 square feet, or $2\frac{3}{4}$ acres.) This total includes 72,949,000 dessiatins of land covered with timber and 9,440,000 dessiatins not covered. The useful timber land is estimated at 45,688,000 dessiatins, making 55 per cent., of the total forest land and 63 per cent. of the specifically forest land. This embraces all the forests of Transbaikalia, the Amur and the Primorsk, and includes the island of Saphalien and the Kamtchatka government. It leaves out the marshland. From this data it can be seen that previous estimates which showed a total of forest land in the far eastern government amounting to 116,000,000 dessiatins, and the total useful forest land amounting to 83,000,000 dessiatins, were greatly exaggerated. The distribution of the forests according to governments and wooded area can be seen in the following statement:

Government	Timber Area Dessiatins	Useful Timber Area Dessiatins	Percentage of Timber Area
Primorsk	32,220,000	19,544,000	64
Saghalien	2,500,000	1,560,000	79
Amur	21,224,000	11,334,000	58
Transbaikalia	21,165,000	10,610,000	77
Kamchatka	5,280,000	2,460,000	4

Forest investigation and organization began in the timber lands of the far eastern governments in 1909, and continued on to 1915. Without going into the particulars per government, it is enough to say that 3 per cent. of the forest land was organized, 14 per cent. was investigated, leaving a balance of 83 per cent. not dealt with.

With the data that has just been procured it is exceedingly difficult to establish even theoretically any estimate approaching reliability of the possible annual disposal of timber materials in the forest lands of the far eastern government.

As to the more immediate position, that is, from the active point of view of the trust called the "Dalprombureau-Dalles," which exploits the Russian Far East timber lands, the export figures for last year are repeated in a general review of the Far East industrial position, showing that over three and a half million cubic feet were exported out of the country yielding an appreciable profit. But the program for the new campaign is more extensive. It is planned to produce 18,000,000 cubic feet, while it is claimed that over ten million cubic feet have already been sold for export, the buyers being Japan and China. Plans are being drawn up for a five-year program, at the end of which the production is estimated at 90 million cubic feet.—*The Timberman.*

大正七年七月十日第三種郵便物認可

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

上海仁記路第五號

遠東時報

Pericle Chieri

SAITO

HIS WORK IN KOREA

THE PORT OF MANILA

HYDRO-ELECTRIC DEVELOPMENT IN N.E.I.

THE DAMAR INDUSTRY

GOLD MINES IN THE PHILIPPINES

CALOOCAN SHOPS OF THE MANILA RAILWAY

TIN MINING IN MALAYA

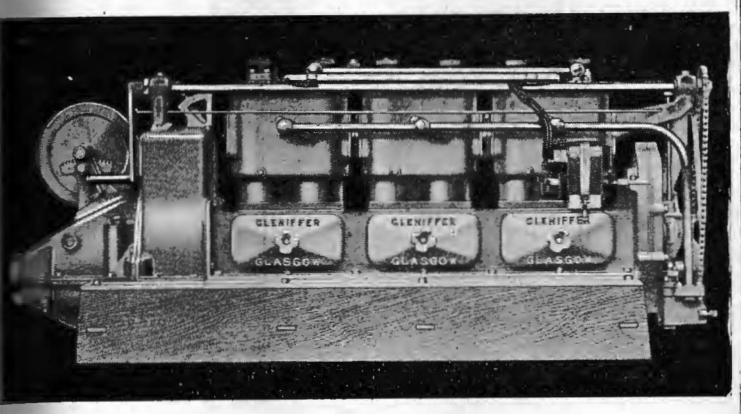
ELECTRIFICATION OF JAPANESE RAILWAYS

Vol. XX December, 1924 No. 12

SHANGHAI, PEKING, TOKYO AND MANILA

A.L. TAYLER

GLENIFFER MARINE MOTORS



36/42½H.P Paraffin Engine and Reverse Gear

A sound British engineering job of compact and clean design.

All working parts entirely enclosed, thus ensuring silent and clean running.

Range of Models—12 to 90 H.P.

Agents: China and Hongkong—THE JARDINE ENGINEERING CORPORATION, LTD., at Shanghai and Hongkong.

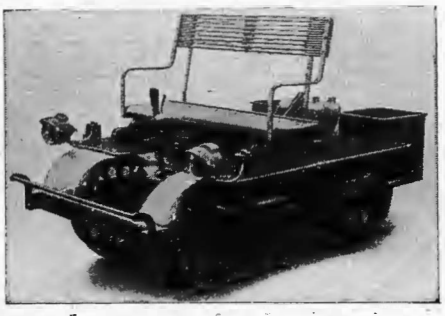
F.M.S. & Straits Settlements—Ritchie & Bisset, 23-25 The Arcade, Singapore

GLENIFFER MOTORS, LTD.,
ANNIESLAND, GLASGOW, SCOTLAND

INTERNAL COMBUSTION

In Service on Over 250 Railways

ECONOMICAL——SIMPLE——RELIABLE



The "Alpha" Trolley, with detachable power unit. Speedy Removal from Track by two men in 7 seconds.

Locomotives
Rail Motor Cars,
Coaches,
Tram Cars,
Rail Inspection Cars.

The Drewry Car Co., Ltd.

13 South Place, London, E.C.2.

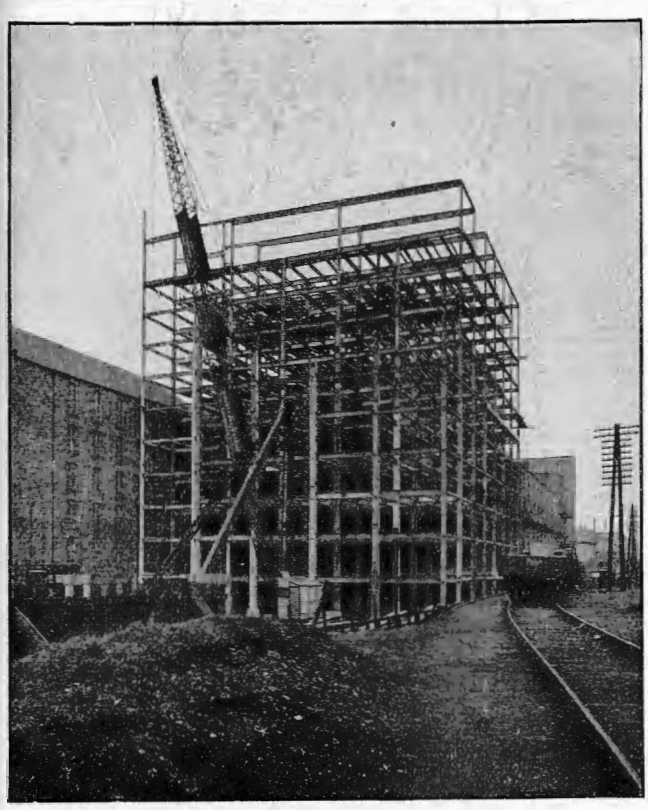
Telegrams "EFFERVESCE" LONDON

Works: Burton-on-Trent, England.

Contractors To: The Admiralty, The War Office, The India Office
The Crown Agents for the Colonies
Foreign and Colonial Governments

Agents in China:
THE JARDINE ENGINEERING CORPORATION, LTD.
8a Yuen-Ming-Yuen Road, Shanghai

FULL PARTICULARS ON APPLICATION



3,000 Tons. Steel Frame Building of ten floors. This type of construction is suitable for all kinds of factories, warehouses, and retail stores. Fire risks reduced to a minimum.

Redpath Brown Steelwork

IN constant demand at home and abroad for all classes of building and structural work—for Factories, Sheds, Warehouses, Bridges, Garages, Godowns, and Pithead Frames. State your requirements and we will supply designs and estimates. Enquiries from architects receive immediate and special attention. With our annual capacity of over 100,000 tons and stocks of steel in hand of 20,000 tons ready for fabrication we are in a position to proceed with the work at shortest notice.

AS Steel Merchants we are also ready to supply from stock, joists, channels, angles, flats, plates, bars, bolts and rivets.

REDPATH, BROWN & CO., LTD.

LONDON: 3, Laurence Pountney Hill, E.C.4.
EDINBURGH (Head Office): 2, St. Andrew Square.
GLASGOW: 19, Waterloo Street.
MANCHESTER: Trafford Park.
NEWCASTLE-ON-TYNE: Milburn House.
BIRMINGHAM: 47, Temple Row.
DUBLIN: 36, St. George's Quay.
BELFAST: 69, Scottish Provident Bldgs.

Cables: A.B.C. Sixth Edition, and Marconi International.

Japanese Representatives: Messrs. L. J. Healing & Co., Eiraku Buildings, Marunouchi, Tokyo.

The Drewry Car Exhibit at Wembley

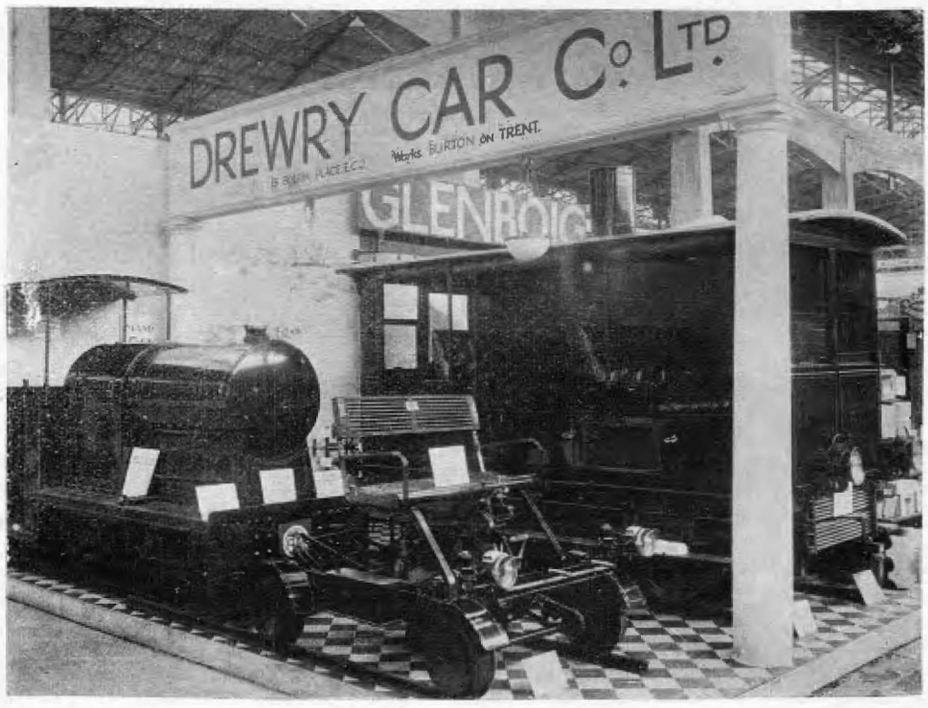
THE rail car exhibited is Drewry standard 20 h.p. type arranged to seat six persons, and is fitted with a four-cylinder engine of 90 m.m. bore by 130 m.m. stroke, which is similar in design and construction to the engines used in Drewry locomotives. A three-speed gear box and reverse gear giving all three speeds in both directions is fitted. The power is transmitted from the gear box by silent chain to the axle. Controls are fitted at each end of the car and it can, therefore, be driven equally well in either direction, the driver always sitting at the leading end.

The newly forged type wheels fitted are 24-in. diameter. Hand brakes are fitted, arranged to operate on both wheels of the axle which is not driven, and in addition there is a foot brake arranged to operate on the countershaft, thus breaking through the driving axle. Tabular radiators are fitted at each end of the car, and water is circulated by means of a rotary pump driven from the engine.

The car is fitted with well upholstered seats having reversible throw-over backs, enablingpassengers to always face in the direction in which the car is traveling. Windscreens are fitted at both ends of the car. The canopy is supported at each corner by pillars and also by centre stanchions at the sides. Side doors are fitted also side curtains which are rolled up under the roof when not in use and can be made to completely enclose the sides of the car.

If required, electric lighting and self-starter sets can be fitted.

The next exhibit is of Drewry light "Alpha" type inspection trolley. This is fitted with a 6 h.p. twin-cylinder air-cooled B. A. S. engine and gear box mounted as a separate unit, so that it can be instantly detached from the chassis. The complete trolley weighs about 5½ cwt. of which the engine and transmission unit weighs 3 cwt. The detachable unit enables the trolley to be very readily and quickly cleared from the track or to be loaded into an ordinary brake van, the seat and power unit being lifted off the chassis after which the chassis itself can be turned up on end and passed through the door of the van. This is a valuable feature and will be particularly appreciated by district and other engineers who have to travel long distances for inspection purposes.



The Drewry Car Co., Ltd. also supply trollies similar in all respects to the "Alpha" type, with the exception that the power unit is not detachable. They can be supplied to suit any gauge and, like the "Alpha," can be fitted with engines varying from 4 h.p. up to 8 h.p. according to the duties and conditions under which they are required to operate.

The locomotive exhibited is Drewry 20/25 h.p. standard type. It is built to a 60 centimetre gauge with a wheel base of 2-ft. 9-in. and is therefore able to successfully negotiate very sharp curves. The under-frame is constructed on steam locomotive lines, the plate frames being ⅝-in. and the buffer beams ¾-in. thick. The driving wheels are of cast steel 1⅛-in. in diameter, the thickness of the treads being 1¾-in. The axles are of steel to main line specification and have journals 3-in. diameter by 5¾-in. long. All wheels are coupled and are driven by side rods mounted on outside spur wheels which are driven by pinions keyed to either end of a cross shaft. This shaft is fitted with a bevel reverse gear. The whole of this reverse gear is enclosed in the casing and is thoroughly protected from dust and dirt.

The locomotive can be driven at two speeds by means of Drewry patent duplex clutch and gear box. This transmission is designed for simplicity and especially to eliminate the difficulty in changing speed when climbing a gradient with a load. There are no gears to disengage and re-engage when speed is being changed. The clutches are attached direct to the gears which are in constant mesh, and are operated by a clutch drum which revolves with the engine. To operate the locomotive after the engine is running, all that is necessary is to push the speed lever into the low gear position and, when changing to top speed, to pull it into the top speed position. There is no clutch to disengage before changing gear, only one lever to push or pull as the case may be, the ordinary engine clutch and clutch pedal being entirely dispensed with. The advantage of this form of transmission is that the speed can be changed going up or down an incline without danger of missing, the change being made instantly without shock or loss of momentum, and the locomotive can be successfully operated even by an inexperienced person.

The engine is mounted at the rear end of the frame. This is a four-cylinder engine having a bore of 4-in. and a stroke of 5-in., and develops 20/25 h.p. while the fuel consumption is about ¾ of a pint per b.h.p. per hour.

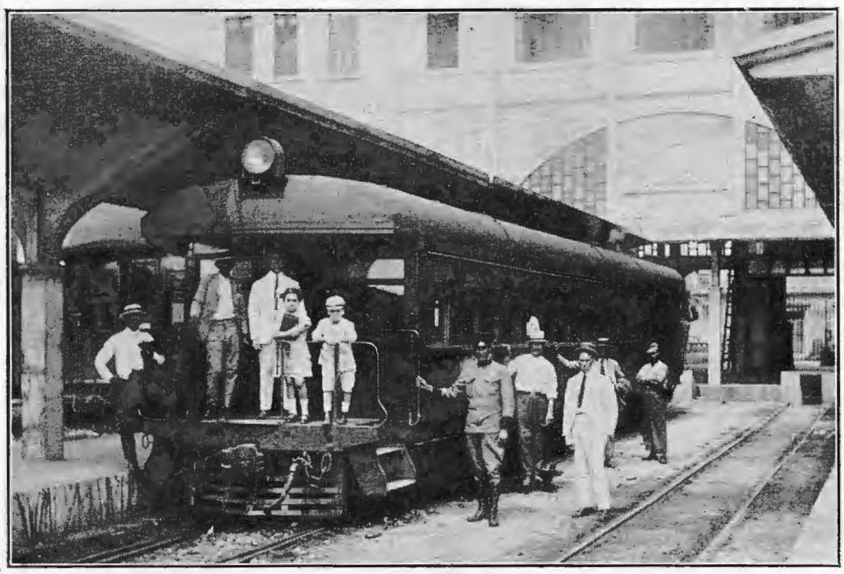
The cylinders are cast in pairs and liberal water jacket space is provided. The valves are of nickel steel, are positively operated and adjustable tappets are provided. Forced lubrication is employed and cooling is effected by means of a rotary pump in conjunction with a large capacity water tank containing 130 gallons of water. Ignition is by means of a high-tension magneto.

The total weight in running order is about 4 tons and locomotives of this type are manufactured by us in sizes ranging from 10 h.p. up to 150 h.p. suitable for any gauge from 2-ft. 0-in. and upwards.

The Drewry Car Co., Ltd., manufacture railway and tramway motor cars from a 4 h.p. light trolley up to main line bogie passenger coaches, and are therefore able to cater for a very wide range of requirements.

As our readers are no doubt aware, these locomotives, cars and coaches are very well known to railway engineers all over the world, and the company have innumerable testimonials from actual users expressing their satisfaction at the thoroughly reliable service which Drewry cars have given, in many cases over periods of ten years and more.

BALDWIN



A BALDWIN STEAM CAR AT SAN JUAN, PORTO RICO
Length of car, 58-ft. 2-in. Weight, 87,000-lb. Seating capacity, 46 persons. Baggage capacity, 291 cu. ft. Gauge, 3-ft. 3⅜-in. Cylinders, 9-in. by 12-in. Driving wheels, diameter, 37-in.

Baldwin Steam Cars Help to Solve Passenger Transportation Problems

WHERE railway tracks can be used, or upon highways where tracks may be laid, Baldwin Steam Passenger cars solve an interurban transportation problem more economically then even the uncertain cab, coach or omnibus service.

We recently built five of these cars for the American Railroad of Porto Rico, where they are in operation along a populous highway. These cars include baggage and toilet rooms, and electric lighting and ice water facilities

WE WILL FURNISH DETAILED INFORMATION UPON REQUEST

OFFICES:

J. M. Wright, Semarang, Java, D. E. I. J. W. Kelker, Harbin, Manchuria

RESIDENT TECHNICAL REPRESENTATIVES:

R. E. McFalls, Peking, China E. P. Williams, Jr., Shanghai, China
J. F. Greig, Tokyo, Japan

AGENTS:

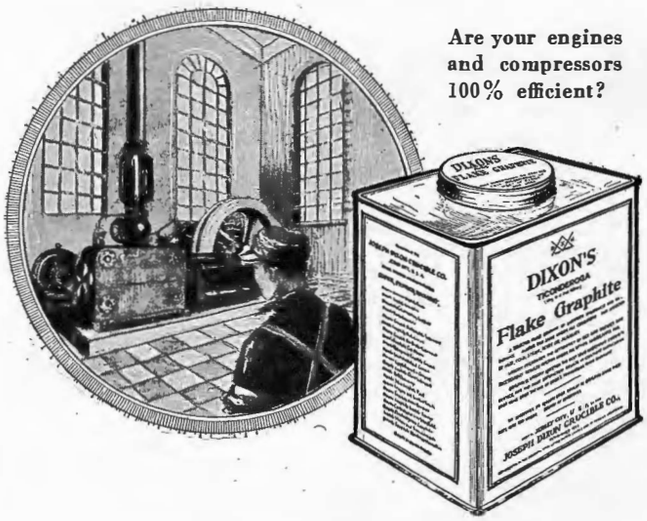
Andersen, Meyer & Co., Ltd., Peking and Shanghai
Sale & Frazar, Ltd., Tokyo and New York
Pacific Commercial Co., Manila, P.I., and New York

The Baldwin Locomotive Works

PHILADELPHIA, U.S.A.
Cable Address: "Baldwin, Philadelphia"

1303

LOCOMOTIVES



Are your engines and compressors 100% efficient?

DIXON'S

FLAKE GRAPHITE

No. 1 Large Flakes
No. 2 Small Flakes

Since the supreme object sought in lubrication is maximum efficiency and satisfactory results at lowest cost the field of lubrication should be thoroughly studied by engineers.

Have you investigated the results that are to be obtained by *graphitic lubrication*?

Savings in this direction mean more horse-power hours of useful work, protection of expensive machinery, and greater fuel and oil economies.

For Dixon's Flake Graphite reduces friction in steam cylinders, and valves, lengthens the life of packing rings, prevents scoring, reduces blowing and minimizes oil in the exhaust. Used in compressor cylinders oil is prevented from getting into the air lines and receivers, and discharge valves are prevented from carbonizing and clogging.

Lower lubricating costs and improved operation await your investigation of Dixon's Graphitic Lubrication. May we send you Booklet.

JOSEPH DIXON CRUCIBLE CO.

Jersey City, N. J. Established 1827

For Prices, Information, etc., communicate with

WALWORTH INTERNATIONAL CO.

29 Szechuen Road, Shanghai, China

Railroad Equipment

Forty years' experience in the manufacture of railroad equipment stand back of Fairbanks-Morse products to-day. Sheffield hand cars are used by railroads in all sections of the world. On many of the large transportation systems, Sheffield is the standard for cars of this type, so well has Fairbanks-Morse met the exacting requirements of railroad service in its hand cars. Many Sheffield cars have given ten to fifteen years' service.

Send for catalogs if interested in: velocipede cars, section motor cars, inspection motor cars, locomotive water cranes, centrifugal pumps, steam pumps, oil or gasoline pumpers, oil or gasoline engines, marine oil engines, electric motors or battery charging outfits.

Manufacturers

Fairbanks, Morse & Co.
INCORPORATED MANUFACTURERS

Export Dept., 30 Church St., New York, U.S.A.

Far Eastern Agents:

Sale & Frazar, Ltd., Tokio
Borneo Co., Ltd., Singapore
Pacific Commercial Co., Manila
M. S. Vernal & Co., Calcutta
International Eng. Co., Bangkok
Technisch Bureau Soenda, Bandoeng
McKenzies, Limited, Bombay